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Health Care Financing Grants and Contracts Report

Evaluation of the Maximum Allowable Cost (MAC) for Drugs Program

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Health Care Financing Grants and Contracts Reports

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Health Care Financing Grants and Contracts Report

Evaluation of the Maximum Allowable Cost (MAC) for Drugs Program

Phase I Report: Final Design Report and Report of Pilot Study Analysis

This report was made pursuant to contract No. HCFA 500-78-0019 between Health Care Financing Administration and Abt Associates Inc., Cambridge, Massachusetts.

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Dr. Feather Davis is the Project Officer.

A. James Lee
Project Director

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1.0 INTRODUCTION

Abt Associates Inc. is conducting this pilot evaluation of the MAC-EAC drug cost containment program in collaboration with Hefner Associates Inc. and Pracon Incorporated. The project is supported by the Health Care Financing Administration, Office of Research, Demonstrations and Statistics (DHHR).[1]

Because of data limitation with respect to other Federal reimbursement programs, this study is relying upon Medicaid data to identify program effects. A time series of Medicaid drug usage data is being collected from five (5) states and examined for MAC- and EAC-related changes in cost and prescription patterns, both by therapeutic category and manufacturer. Data are also being sought for purposes of assessing MAC-EAC effects on administrative cost, provider participation and physician behavior. In addition, a time series of more aggregate MAC program data is being compiled by state for cross section/time series econometric analysis. This multivariate effort will be useful in generalizing results from the sample states to the nation as a whole.

In order to conduct these analyses it was necessary to survey the states and prepare a profile of state Medicaid drug program parameters and data availability. These data were used to identify those states maintaining requisite data and to ascertain other program criteria for purposes of sample selection. In addition, these program data will be used for econometric study purposes.

The study is being conducted in two phases. In Phase I--the first twelve months--the profile of state programs was prepared. In addition, the evaluation methodology was developed and tested in one of the sample states, Massachusetts. In Phase II--the second nine months--data will be collected from an additional four states and all analyses completed.

---

[1] Whereas much discussion of the MAC-EAC program to date has focused on procedural aspects of program implementation (e.g., see Gagnon and Jang), this evaluation study will be almost exclusively concerned with the final outcomes -- i.e., it will be more nearly a benfit-cost type evaluation.

This Phase I Report gives the final research design for evaluating the MAC-EAC program. In addition, it reports results from the Massachusetts pilot study. It further reports findings from the Survey of Medicaid Drug Programs.

Major findings from the pilot state analysis in Massachusetts are summarized below:

- MAC Reimbursement Limits. In the Massachusetts Medicaid program, price limits on the first five MAC products are saving at least $200,000 per year--12-14 percent of the total reimbursement cost for these products (including fee).
- EAC Reimbursement Limits. In Massachusetts, the state's EAC program is saving at least $1.5 million per year.
- Administrative Costs. The (incremental) administrative cost of implementing and operating the MAC/EAC program in Massachusetts was less than $20,000. However, part of a recent increase in the dispensing fee may also be attributed to the MAC/EAC program, adding almost half a million dollars per year to overall program costs.
- Overall. The Massachusetts Medicaid program is saving between $1.2 and $2.2 million annually--3.2 percent and 5.9 percent, respectively, of total drug reimbursement expense.

The remainder of this Report is organized as follows: Section 2.0 gives a summary list of evaluation hypotheses for convenient reference. Section 3.0 presents background information on the MAC-EAC program. Section 4.0 briefly identifies significant features of the pharmaceutical marketplace affecting this evaluation. Section 5.0 reviews literature relevant to MAC-EAC evaluation. Section 6.0 develops evaluation hypotheses in the context of a conceptual discussion. Section 7.0 presents the results from the Survey of Medicaid Drug Program. Section 8.0 presents the sample state methodology and reports pilot study results for Massachusetts. Section 9.0 develops the econometric methodology. Finally, Section 10.0 indicates some very preliminary observations on the basis of the pilot study and discusses activities planned in Phase II of the study.

2.0 SUMMARY OF MAC-EAC EVALUATION HYPOTHESES

The hypotheses listed below were developed in Section 6.0 and suggest the various potential impacts of the MAC-EAC program. Although the principal hypotheses will be tested in this study, many secondary and tertiary hypotheses either can not be easily tested or do not fall within the scope of this study. The extent to which each hypothesis is to be tested in this study is indicated below in parentheses: (A) to be tested, (B) to be partially tested, and (C) not to be tested.

Overall:

H_1: The societal benefits of the MAC program exceed the societal costs. (C)

Government:

H_2: Lower government reimbursements for drug products will exceed any associated increased costs. (A)

H_3: Lower government reimbursements for drug programs than would have occurred without the MAC/EAC program may result from:

- Lower reimbursements for multisource products because of the MAC limit. (A)
- Lower reimbursements for single-source products because of the EAC limit. (A)
- Lower total prescription reimbursements because of the usual and customary upper limit. (B)

H_4: Increased costs may result from:

- Increased administrative costs. (A)
- Increased dispensing fees in reaction to the EAC program. (A)
- Switching from lower priced multiple-source products to therapeutically equivalent higher priced single-source products. (A)

Brand-Name Manufacturers:

H_5: MAC reimbursement policies may lower overall revenue in the pharmaceutical industry and eventually may reduce net profits. (C)

H_6: Given the potential for lower future profits, the industry may react as follows:

Marketing Strategy

- In the short run, encourage physicians to specify "brand necessary". Emphasis may be placed on comparative product quality. (C)
- In the long run, encourage physicians to prescribe more single-source products, especially where they compete with MAC products. (B)
- Promotion of multiple-source products may shift from physicians to pharmacists, who will increasingly be determining brand selections. (C)

Pricing Strategy

- Anticipation of the MAC program may result in higher short-run prices, to provide the manufacturer with higher total revenue. (B)
- Reductions in the pricing levels of MAC products may depend on the relative importance of the Medicaid market, the perceived potential for a spillover into the non-Medicaid market, and the magnitude of the price differential between the branded product and the MAC level. (C)
- If prices on multiple-source products are reduced, the prices of single-source products may be increased to maintain a constant revenue position. The long-run viability of the position will be affected by patent expiration dates and the substitutability of therapeutic equivalents. (C)

Research Strategy

- Research expenditures for product modifications may be stimulated to provide a group of sole-source products that can be used to transfer physicians prescribing allegiance (e.g.- Darvon N was introduced shortly before the Darvon patent expiration date). (C)
- Research expenditures for new drug development may be reduced. (C)

Product Strategy

- Increased emphasis on quality production for use in marketing campaigns. (C)

- Expanded offerings of generic (or branded generic) products for MAC products; especially for large selling products just losing their patent protection. (C)

- Elimination of certain free services to reduce costs. As price competition increases, the additional services provided by the large manufacturers may decrease in importance. (C)

Generic Manufacturers

H_7: MAC reimbursement policies will improve the possibilities for generic manufacturers to enter the non-hospital market. However, if brand name manufacturers expand their production of generic or branded generic product lines, the smaller generic manufacturers may be unable to penetrate this market. (C)

H_8: The MAC pricing levels may tend to become a "floor" for generic manufacturers' prices. (B)

Distributors:

H_9: Wholesalers' sales may not be substantially affected by the MAC program, unless pricing pressures force manufacturers to expand their volume of direct sales accounts. Also, wholesalers may expand their offerings of generic products. (C)

H_{10}: Given the movement towards actual acquisition cost programs, discounts may tend to be included in the overall cash discount, thereby "inflating" the invoice line price used to calculate acquisition costs. (C)

Dispensers:

H_{11}: Costs of operating a pharmacy may be slightly increased for the following reasons:

- Double stocking of MAC products may occur, especially in states with anti-substitition laws, thereby increasing inventory costs. (C)

- A pharmacy may dispense a higher-priced brand name product for lower-priced MAC products that are not stocked. (A)

H_{12}: The level of pharmacy reimbursements may be reduced through the EAC program as the "float" between AWP and AAC is eliminated. (A)

H_{13}: If increased costs and reduced revenue result in lower pharmacy earnings, pharmacies may respond in one of several ways:

- Reduce or eliminate free services (e.g., patient profiles). (C)

- Increase prescription prices to private patients. (C)

- Refuse to participate in the Medicaid program. (B)
- Request "brand necessary" certification from physicians for MAC products they do not stock. (C)
- Engage in fraudulent practices to increase revenue (e.g., prescription splitting). (B)
- Dispense more generic products to private patients in order to receive a greater profit margin. (C)

Prescribers:

H_{14}: Physicians may exercise their override option in the short run, but will not in the long run. (A)

H_{15}: The MAC program may result in more generic prescribing. As more brand name manufacturers enter the generic field, fears of inferior product quality will decrease. (C)

Consumers:

H_{16}: Private third-party prescription drug programs may eventually follow the government's lead and institute MAC programs. (C)

H_{17}: The MAC program may cause prescription prices to private patients to increase as pharmacies shift the burden of lower EAC ingredient costs reimbursements from Medicaid onto their private paying customers. (C)

H_{18}: The long run impact of the MAC program may be an overall reduction in prescription prices for the following reasons:

- Increased price competition on multiple-source products may spillover into the non-government market. (C)
- Increased generic prescribing by physicians may benefit the private consumers. (C)
- Increased substitution by pharmacists may benefit the private consumers. (C)

3.0 BACKGROUND ON THE MAC/EAC PROGRAM

To understand the Maximum Allowable Cost (MAC) program, it is essential to describe the drug industry, the actual impetus for the program, and the preconditions that made the program possible.

3.1 The Drug Industry Background

The source of drug products is the domestic drug industry; imports are only a minor factor. Manufacturers' sales in 1978 were approximately $9.3 billion, growing at an annual rate of approximately 8 percent per year. About 48.5 percent of these sales are to wholesalers, 26.5 percent to retail pharmacies, 20 percent to hospitals, and less than 2 percent to private practitioners. Wholesalers in turn distribute to retail pharmacies, hospitals, and other health institutions, marking up the cost somewhat, depending on the customers, the drug, the volume purchased, and other factors. Pricing and distribution policies differ by manufacturer. Some manufacturers sell only through wholesalers, others sell directly to retail pharmacies. Prices for direct sales are lower than those through wholesalers. Depending upon the nature of the product being sold, departures may be made from published wholesale or direct list prices as a result of special deals, free goods, quantity discounts, year-end rebates, and the like. These factors have led to significant difficulty in developing equitable reimbursement levels on prescription drugs under federally financed programs.

There are approximately 300 major wholesale houses, 55,000 retail pharmacy outlets, and 7,000 or so hospital pharmacies. Most drugs are dispensed to end-users through prescriptions (Rx) filled in retail pharmacies on an outpatient basis. These account for 65 percent of all Rxs, with the remaining 35 percent being dispensed to patients in hospitals and institutions. The trend has been toward increased inpatient Rxs as a percentage of the total, with a change from 28 percent in 1967 to 35 percent in 1974 (Prescription Drug Data Summary 1974, DHEW/SSA/ORS).

Another trend is an increase in prescriptions filled by hospital pharmacies, which rose from 6.9 percent in 1967 to 8.8 percent in 1974. Perhaps more important, is the continued growth of chain stores. In 1972, independents filled 66 percent of drug store prescriptions and chains the remaining 34 percent. By 1975 independents had dropped to 61 percent and chains had grown to 39 percent. It is interesting to note that in 1975 the average prescription price in an independent store was $5.01 while the chain store had an average price of $4.79.

The cost to the consumer of a prescription from a retail outlet is comprised of an allowance for "product" or ingredient costs--the cost of the product to the retailer--plus a dispensing fee, either a fixed amount or a "mark-up" on product costs. Medicaid reimburses a "fixed" amount rather than a mark-up, although the amount may vary by store size, service capabilities, and other characteristics. Average prescription costs have grown from around $3.49 in 1967 to $5.29 in 1978 (American Druggist, Annual Prescription Surveys) reflecting not only product price increases but also new product introductions, larger Rxs (more units per Rx), and higher pharmacy operating costs (labor, inventory carrying charges, rent, etc.).

New drug products emanate primarily from the laboratories of large drug manufacturers. These products consist of new chemical entities, variations and combinations of existing substances and new dosage forms. Introductions of new drugs are to a large extent controlled by the Food and Drug

Administration (FDA). In 1960, there were about 300 new product introductions, mostly combination products, while in 1974 some 83 new products were introduced.

New products are granted patent protection for 17 years, resulting in what some observers refer to as "product monopolies" within various therapeutic categories. Products which are still under patent protection are available only from the discoverer (unless there is a licensing agreement in effect) and are termed "single-source" drugs; e.g., Aldomet, Keflex. Drugs available from more than one supplier, either through licensing or because of expiration of their original patents, are termed "multi-source" drugs. "Branded" products are marketed under proprietary trade names; e.g., Darvon. Often times there is a significant disparity in the prices of two different products of the same chemical formulation. Certain elements of the manufacturing industry justify this differential on the basis of quality control and R&D expenditures. Others claim that quality and equivalency are not problems and thus there is no reason to pay more for a drug than the lowest price. The FDA generally subscribes to the latter view as does the Office of Pharmacy Reimbursement, hence the new regulation that HEW will not reimburse for multi-source drug products except at the lowest price level at which they are widely and consistently available.

3.2 Drug Price Control Background

It has long been recognized that substantial variations exist in the prices charged by various manufacturers for multi-source drugs. Hearings by the late Senator Estes Kefauver and subsequently by Senator Gaylord Nelson documented by brought these to the public's attention. While they and others proposed a number of actions to address price differentials, the first comprehensive proposal for cost control in government reimbursement programs was presented in the reports prepared by the Task Force on Prescription Drugs in 1969. The Task Force, formed to consider a drug benefit program for Medicare, outlined a specific set of policies to control the cost of third party drug programs. Two important reimbursement methodologies suggested at that time were Actual Acquisition Cost (AAC) and a Maximum Allowable Cost (MAC).[1]

The use of actual acquisition cost for setting drug reimbursement is essentially a data gathering and analysis problem and is closely associated with the professional fees allowed for pharmacists. This will be discussed in detail below. The Maximum Allowable Cost concept is much more involved and depends on a number of other factors. These will be considered next.

There are several basic requirements for setting a Maximum Allowable Cost on a drug: first, and most obviously, the drug must be available from several sources; second, there must be sufficient variation in the price charged; third, the drug must be available to the public or target population at the price selected; and fourth, there should be no known problems with respect to drug product quality/equivalence.

A MAC program for Medicaid and Medicare was, of course, theoretically possible in 1969 and 1970, but many of the preconditions suggested above were very much unresolved. By far the most important one was the question of quality/equivalency. The major pharmaceutical manufacturers argued then, and still argue, that lower-priced generic drugs are not equivalent to their own brand name drugs. They contend that the physician cannot be sure of the pharmacological action of a generic drug in a patient and that the patient is treated based on price and not quality. This argument has had some validity if one compares a brand name drug to those of certain smaller manufacturers. Over the last several years, however, the industry argument has lost much of its merit because of the entry by many major companies into the generic market and by the FDA's development of new Good Manufacturing Practice (GMP) requirements and bioavailability regulations. The bioavailability regulations first proposed in 1975 and made final on January 7, 1977, confirm FDA's determination to assure the equivalence of drugs. The FDA specifies both those drugs with bioavailability problems and those that have no such problem. As a further commitment to equivalency, FDA has recently developed and issued a list of interchangeable drugs. One major obstacle to substituting a lower priced drug has thus been substantially lessened.

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[1] Task Force on Prescription Drugs, Approaches to Drug Insurance Design, (Washington, D.C.), February, 1969, pp. 15-19.

Directly related to the quality issue is substitution itself. With equivalence no longer looked upon as a major problem, state legislatures, supported by the American Pharmaceutical Association and many consumer groups, no longer saw the need for antisubstitution legislation and felt that through substitution the consumer would have the opportunity to purchase multi-source products at lower costs. At this writing 43 states and the District of Columbia have adopted laws permitting pharmacists to dispense a chemically equivalent drug product for a drug prescribed by trade name. Fifteen states have positive formularies, i.e., lists of drugs deemed equivalent and interchangeable. Eleven states have negative formularies, i.e., lists of drugs deemed not equivalent and which may not be substituted. All states have some provision that permits the physician to override substitution. All states except New Hampshire either imply or require that there be a cost savings to the consumer, but the savings are defined in a variety of ways: differences in wholesale (four states), differences in acquisition costs (11 states), difference in retail price (six states). In addition, four states prohibit the pharmacist from charging a different fee when substituting. Substitution, and concomitantly, generic prescribing, have become acceptable public policy concepts, and programs to promote them have been implemented. Thus, it is apparent that the MAC program for publicly financed pharmaceutical reimbursement has been implemented during a period when the private marketplace has been in a state of considerable transition.

Another precondition for MAC is the availability of drugs to substitute; the greater the number of multi-source drugs, the greater the opportunity to achieve savings. In 1969 and the early 1970's, practically all major drugs enjoyed patent protection. This situation has changed dramatically over the last eight years, and by 1981, 117 of the current top 200 will be off patent. Table 3-1 presents a summary of drugs losing patent protection starting in 1975.

The preconditions to establishing a MAC program have been described, but the most important and direct cause has as yet remained undiscussed, cost control. In 1976, national expenditures for drugs and related products were approximately $11.2 billion. Of this amount, all federal, state, and local government drug expenditures were about $3.4 billion or 30 percent of total national drug expenditures. Using this total, about $2.0 billion (59 percent) is estimated as "product" or ingredient costs and the remainder "overhead" or dispensing costs. Clearly, government purchases are a major segment of the market for drug products in the United States.

Table 3-1: Sales of Drugs and Patent Expirations
($ in Millions)

	Total Sales 1974	Unrestricted	In vitro	In vivo
No Patent, Patent Expired, Patent Not Meaningful	$1,210	$1,030	$ 56	$124
Patent Expirations:				
1975	45	45	-	-
1976	211	73	138	-
1977	123	93	30	-
1978	103	65	-	-
1979	225	107	106	12
1980	387	343	26	18
after 1980	933	622	209	62
Total	$3,237	$2,418	$565	$254

Note: Unrestricted, in vitro, and in vivo refers to the products for which estimated bioequivalency requirements are made in the proposed regulations, published in the Federal Register on January 7, 1977.

Source: Halsey, Stuart & Company, Inc., "MAC, Maximum Allowable Costs, Price Limitations in Government Financial Drug Programs" (New York, October 16, 1975), p. 11.

Table 3-2: National and Government Drug Expenditures in FY 1974 and Projections for FY 1976
($ in Millions)

	1974	1976
National	$9,695	$11,168
Government	2,980*	3,373*
HEW	1,593	1,803
DOD	154	174
VA	93	105
Other Federal (AID, HUD, OEO, and others)	62	70
State and Local	991	1,121

*Total is different from some of elements due to rounding and transposition errors.

Source: Thomas R. Fulda, "Prescription Drug Data Summary, 1974" DHEW/SSA, Office of Research and Statistics, various tables, and projections based on FY 1976 SSA drug expenditure totals.

These numbers are based on extrapolations from the last year, 1974, in which the government prepared complete statistical information on drug purchases. The 1974 data and the 1976 extrapolations, based on the 1976 total drug expenditures reported by the Social Security Administration, are presented in Table 3-2.

The primary fuel for growth in government purchase has come from implementation of the Medicaid and Medicare programs, and the federal and state funds expended by these programs. Expenditures in these programs grew over 400 percent in the years 1967-1975 (see Table 3-3).

In addition to the large federal, state, and local government outlays for drugs, there has been a significant increase in the prices of drugs over the last several years. Table 3-4 shows the total medical care components of the consumer price index (CPI) and the prescription drug portion of that CPI for selected years beginning in the base year of 1967. It should be noted, however, that drug prices have escalated only in the last four years and not at the enormous rate endemic to health care services in general. One should, however, be cautious in the use of the drug CPI because it is a fixed market basket of drugs and does not include new and generally more expensive drug introductions.

The rise of federal and state expenditures in Medicare and both federal and state expenditures in Medicaid as well as the increases in the prices of drugs caused the development of various approaches to cost control, including Maximum Allowable Cost programs. Such programs were primarily carried out by state Medicaid agencies, because Medicaid was the only program to pay for outpatient drugs. Application of cost controls in the hospital setting is fraught with difficulty. Hospitals neither purchase nor keep data on drug use

Table 3-3: Federal and State Medicare and Medicaid Expenditures, Selected Years, and Percentage Increases
($ in Millions)

Fiscal Year	Expenditures	Percentage Increase
1967	$ 599.0	74%
1969	1,042.1	74%
1971	1,439.9	38%
1973	1,871.1	30%
1974	2,246.6	20%
1975 (est.)	2,701.7	20%

Source: Fulda, Ibid.

Table 3-4: Total Medical Care Consumer Price Index and Prescription Drug CPI, Selected Years

Fiscal Year	Total CPI	Prescription Drug CPI
1967	$100.0	$100.0
1970	120.6	101.2
1972	132.5	100.9
1974	150.5	102.9
1975	168.6	109.3
1976	184.7	115.2
1977	202.4	122.1
1978	219.4	131.6
1979 (February)	232.6	138.4

Source: "Social Security Bulletin," Volume 42, Number 5, May, 1979, p. 88

in the same way as the retail pharmacy. Drugs in hospitals are purchased in volume, generally at prices markedly below manufacturer or wholesaler prices to retailers. Furthermore, hospitals do not generally report specific drug product costs by patient, e.g., 50 tablets of meprobamate at $.10 a tablet for a total charge of $5.00. Instead, hospitals have a line item for all drug charges in the total bill. Finally, hospitals are not reimbursed by Medicare and Medicaid for specific drug charges. There is, however, an exception to this that should be noted, hospital outpatient departments. Given that hospitals bill at the same level as a retail pharmacy and purchase at hospital bulk costs, there is an opportunity for savings and cost control. This becomes especially cogent when one considers certain hospital outpatient facilities that have become by attrition the only available pharmacy facility for Medicaid patients in certain central city locations.

In 1961 California, under the Public Assistance Medical Care Program, and forerunner of Medi-Cal, established "Maximum Allowable Wholesale Costs" for ten multi-source drugs. This plan continued through the initiation of Medi-Cal in 1966. In 1972, Medi-Cal extended the ceiling prices to a number of other multi-source drugs, a total of 198, including various strength and dosage forms. As a feature of this program, manufacturers whose drugs exceeded the ceiling could refund the difference and be included in the program. This approach was successfully challenged in court, and in 1973 the Maximum Allowabl Ingredient Cost (MAIC) was implemented. The MAIC has served as one example of a MAC program for both the federal government and other states. Another important early MAC was implemented when the Tennessee Medicaid program added selected generics to its formulary in 1972. Each drug included had an upper price maximum established, and the University of Tennessee College of Pharmacy ran bioavailability tests to assure quality. The so-called state "mini-MACs" have now expanded to include twelve states. In addition to these, state Medicaid programs have imposed a number of other drug program cost control methodologies. These have included: quantity and refill limitations; restricted formularies; co-payments; actual acquisition costs basis for reimbursement; prior authorization; and utilization and peer review.

All these various strands come together in the federal MAC. There were operational examples of MAC programs at the state level. There was the repeal of substitution legislation and the drive for generic prescribing, undertaken by the desire to reduce the costs of drugs for consumers in general. The quality issues have been muted by the FDA commitment. The general atmosphere of greater cost control in government-funded health programs was reinforced by the "prudent buyer" clause of the Social Security Amendments of 1972. Thus, based on the proposals of the Task Force on Prescription Drugs and the example of various state programs, then HEW Secretary Casper Weinberger, in December 1973, first proposed the federal MAC regulation. After two years of consideration and substantial controversy, they were made final by HEW on July 25, 1975.

3.3 MAC Regulations

As written, the regulations have five major components: Maximum Allowable Cost (MAC) reimbursement for multi-source drugs; Estimated Acquisition Cost (EAC) reimbursement for all drugs; dissemination of prescription drug price information; implementations of usual and customary charges as a price ceiling; and a directive that professional fee studies be performed by each state program. A discussion of these follows with fee studies subsumed under the EAC section:

3.3.1 MAC

A MAC can be established for any multi-source drug for which significant amounts of federal funds are or may be expended and for which there are or may be significantly different prices. The regulation requires that "the Board [Pharmaceutical Reimbursement Board] determine the lowest unit price at which the drug is widely and consistently available from any formulator or labeler. This determination will be based on the package size of the drug most frequently purchased by providers."

In establishing a MAC, the Pharmaceutical Reimbursement Board first identifies multiple source drugs, determines the lowest unit price, and determines the potential savings to the government from setting the MAC. The Board is assisted in this by the Office of Pharmaceutical Reimbursement, HCFA. Once a drug has been initially identified for a MAC, the FDA Bureau of Drugs and the appropriate division within the Bureau advise the Board "whether there is any regulatory action, either pending or under consideration, bearing upon the marketability or the establishment of bioequivalence that in the judgment of the FDA may be a reason for delaying or withholding the establishment of a MAC for a drug." Following FDA approval of the drug, the Pharmaceutical Reimbursement Advisory Committee (PRAC) advised the Board on the MAC and oversaw public hearings on the MAC. (Important regulatory changes bearing on this process are discussed below.) Based on the PRAC findings and any further hearings, the Board makes the final MAC decision. This is then communicated to Medicare, Medicaid, and Public Health Services programs.

The central purpose of the Maximum Allowable Cost provision was and is to take advantage of the price differentials between brand name products and lower-priced competition; paying only for the less expensive version and thus realizing the savings. The program has other less explicit purposes. One is to reinforce substitution and generic prescribing. By conditioning physicians to write generically, it is hoped that their modified prescribing behavior would spillover to the private sector. Another is to promote price competition in the multi-source market.

3.3.2 EAC

The Estimated Acquisition Cost (EAC) portion of the MAC program is designed to limit payment for both single and multi-source drugs to the estimated pharmacy acquisition costs plus a dispensing fee. The regulations say that EACs should "be the State's closest estimate of the price generally and currently paid by providers. Such estimates shall be based on the package size most frequently purchased by providers. To aid states in making cost estimates, the Department will make available information on a current basis on acquisition costs of the most frequently purchased package size of drugs. These data will cover the majority of the most frequently prescribed drugs."

The Office of Pharmaceutical Reimbursement (OPR) in HCFA collects this information under a contract with IMS America, Ltd., and disseminates it to the states. IMS provides OPR the results of a continuing survey of all purchases for drugs in 1,000 pharmacies. The survey gives the invoice level prices for the 300 most frequently purchased chemical entities and the most frequently purchased dosage forms and strengths. The mean, modal, and median price for each listing are calculated. Initially, the higher of the mean and modal prices were used for the suggested EAC. In 1977, the format was changed to vary from the tenth to the ninetieth percentile and included a listing of the mean and standard deviation. The mean and standard deviation are based on units sold rather than invoice lines. These data are supplied to the states as guidance, and it is the responsibility of each state Medicaid program to determine the EAC as closely as possible to actual acquisition costs.

As recognized by the Task Force study, the prices reimbursed for drugs could be seriously at odds with the prices at which a pharmacy purchased the drugs. In most cases reimbursement was based on the average wholesale price (AWP) for the drug as listed in the Red or Blue Book. These prices failed to reflect several different kinds of purchasing arrangements that reduced costs to the pharmacy. These include: direct purchase from the manufacturers at a lower price than from a wholesaler; percentage reductions on overall purchase costs based on volume of business; and special "deals" and discounts offered by both manufacturers and wholesalers. It was generally understood that AWP was not a true gauge of pharmacy acquisition costs based on these factors. Concomitant with this, however, was the relative low level of the pharmacy professional fee. The reasoning being that while ingredient costs were slightly high, fees were slightly low, and that the results were a fair reimbursement compromise. By implementing the EAC portion of the MAC program, reimbursement was changed from charges based on AWP to a cost model. Ingredient costs would be based on actual or estimated acquisition costs, and each state would do a study to determine the allowable fees to be charged based on cost-finding methodologies.

In other words, the government was attempting to move to a more accurate basis for cost reimbursement for publicly financed health programs, e.g., Medicare, Medicaid, and National Health Insurance, when implemented.

3.3.3 Usual and Customary Charges

In conjunction with the price limits established by MAC and EAC is a third reimbursement limit, the pharmacy providers' usual and customary charge to the general public. Medicaid, obviously does not want to pay any more for a given drug product than the public. Such a situation is entirely possible with the ingredient cost plus fee arrangement. This is because pharmacists can and do purchase drugs at prices lower than the EAC levels established by the state and Federal governments. Without usual and customary charges the pharmacists could charge Medicaid the EAC price plus fee even if he or she passed the savings along to other customers. Thus, in a sense usual and customary can be used to assure a reimbursement level approaching acquisition cost. This situation can, of course, be reversed. A pharmacy with high charges to the general public is restrained by the MAC and EAC limits.

3.3.4 Drug Price Information

An additional responsibility of the MAC program not covered specifically in the regulations is to prepare and issue a guide to economical drug selection. It is the view of HEW policymakers that with more comparative drug price information available to physicians, they will tend to prescribe lower cost drugs, particularly in the multi-source market. The PRB will, therefore, publish and update on a regular basis a guide to comparative drug prices for physicians. The guide will show differences in prices charged for different brands of the same drug or for drugs having the same general therapeutic effects. A similar program, PARCOST, was initiated several years ago in Canada and has apparently met with considerable success.

3.4 MAC Current Status

The MAC regulation became effective August 26, 1976, amid yet more controversy, and the implementation since that time has not been altogether placid. In the process of setting MACs, Eli Lilly and Company (marketers of the product Darvon, the original version of propoxyphene) pursued litigation on the issue of inequivalency of propoxyphene. The company lost the suit, suggesting that the question of quality assurance on the part of HEW/FDA is beyond legal challenge, thus removing yet another barrier to widespread expedient implementation of the MAC regulation. In another MAC attempt by HEW, the originators of the tranquilizer Librium (chlordiazepoxide), Roche Laboratories, successfully argued before the Advisory Committee that chlordiazepoxide (CDP) was not "widely and consistently available." The Board reversed the Advisory Committee and put a MAC on CDP. Roche then initiated a suit and won a temporary injunction in federal court, but was reversed in the final judgment, once again setting legal precedent in favor of the HEW Program.

This did not completely end the difficulties faced by HEW in implementing the program. Serious questions were raised concerning conflicts-of-interest on the Advisory Committee, especially about industry representation on the Committee. Finding it impossible to resolve these conflicts, new regulations were published August 9, 1978, to eliminate the Committee and simply have the PRB establish MACs with the assistance of consultants and public hearings.

From that time the MAC program has moved somewhat more quickly. From September 1976 until February 1978 MACs were placed on 15 dosage forms of five chemical entities. From February 1978 until September 1978, the PRF issued final MACs on 15 chemical entities including 29 different dosage forms. It has also lowered the prices on several previously MAC drugs.

This has not occurred without difficulty. Pfizer raised the bioequivalency issue with doxepin HCl but it was dismissed by the FDA. However, MACs were delayed for hydrochlorothazide and amoxicillin from December 1978 until May 1979. Although a MAC was proposed for erythromycin (base) it was voted down by the PRB due to bioequivalency problems caused by the kind of coating used for the tablet.

The EAC part of the program has also met with problems. There have been arguments about what represents actual and estimated acquisition costs and how fees should be determined. As suggested above, the current approach is to supply price-related decile information to states. Data provided to the states for guidance is generated by IMS and have been the center of considerable controversy. Claims of inaccuracy and inequality between single stores and chains, particularly from independent retailers, have been made repeatedly. Thus, problems have arisen with respect to provider participation due to claims by some pharmacies that EAC prices are unreasonably low. Fee studies as required by the regulations are being or have been performed by most states. These have resulted in higher fee levels in many states and in part compensate for the lower ingredient cost reimbursement levels brough about by EAC.

The third portion of the program, the guide to comparative drug prices, is now being prepared for distribution. The current due date is set for December 1979. In the prepublication draft there are comparative prices for 196 drugs in 16 therapeutic classes. The drugs covered in the guide are those most often prescribed. About half the drugs listed are single source. The price information is based on the seventieth percentile of the IMS survey on EAC prices. In draft format the publication shows: the unit price per product to the pharmacist; daily therapy cost (unit price times FDA recommended therapy); and bar graphs demonstrating the cost of the average daily therapy. The guide will be distributed to 60-65,000 community pharmacies, 260,000 office-based practicing MDs, and 4,500 hospital pharmacies.

4.0 AN OVERVIEW OF THE PHARMACEUTICAL MARKETPLACE

Analysis of the direct and indirect impacts of the MAC program requires a basic understanding of the pharmaceutical marketplace. In order to reliably assess MAC-related impacts, it is also necessary to take account of other market forces. This section gives a summary discussion of the primary factors affecting the prescription drug market. For this purpose, the market is divided into six interest areas: (1) manufacturers, (2) distributors, (3) dispensers, (4) prescribers, (5) drug program administrators, and (6) consumers.[1]

4.1 Manufacturers

The manufacturers represent the focal point for evaluating the MAC program. Limiting reimbursements to "the lowest priced generally available brand of product" is designed to reduce payments to manufacturers of higher priced brands. As a result, the discussion of manufacturers will focus on two classes: brand name manufacturers and generic manufacturers.

4.1.1 Brand Name Manufacturers

Brand name manufacturers represent a sizeable portion of the health care market. Although there are fewer than 30 large brand name manufacturers, most have total corporate sales of $1 billion or more. These firms are multi-national corporations, and several of the largest are foreign-based.

These large firms, which are represented in Washington, D.C. by the Pharmaceutical Manufacturers Association, have similar characteristics:

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[1] See Drug Product Section, a Staff Report to the Federal Trade Commission, 1979, Chapters II - V, for a more comprehensive survey of market factors.

- Patents - These firms have attained and maintained dominance through the introduction of new products which have received patent protection. The large number of patented products has tended to insulate the firms from direct competition. However, this pattern is changing rapidly as patents on significant products expire.

- Quality Control - The firms maintain high standards for quality control. Production standards of the largest firms are both a source of pride and a major selling point in advertising.

- Research and Development Expenditures - Approximately 6% of every brand name manufacturer sales dollar is spent on research and development, of which 10% are for basic research and 90% are for applied research. During the past decade, there has been a reduction in basic research expenditures because of the low payoff potential. However, development expenditures remain an important cost component.

- Marketing Force - The largest segment of the marketing force is composed of detailmen who continuously visit physicians and present information regarding their firm's products. Most marketing has been directed at physicians because they are the ones that order prescriptions. Most estimates project that marketing expenditures average approximately $5,000 per practicing physician per year.

- Sales Markets - Manufacturers operate in three relatively distinct markets: retail pharmacy, hospital, and other large purchasers. The retail pharmacy market is composed of purchases by independent pharmacies or chains. The hospital market, which consists of most inpatient facilities in the country, has less reliance on brand name products. Consequently, price competition is more keen in the hospital market than it is in the retail market. Other large purchasers include groups such as the Defense Department and Veteran's Administration, which purchase large quantities of medication at substantially reduced prices.

These large firms recognize their mutual interdependence, and their pricing and marketing strategies tend to be similar.

Pricing Strategy

The pricing strategy may vary slightly between firms and product lines, but generally is affected by the following factors:

- **Type of Market** - Non-retail markets tend to utilize competitive bid procedures. As a result, prices to hospitals and other large purchasers tend to be considerably lower than the prices charged to retail firms.

- **Type of Medication** - Pricing strategies often vary between acute and chronic medications. Acute medications tend to have higher prices than chronic medications. Patients receiving chronic medications tend to be more price conscious because of the refill aspects of the product. In addition, elderly persons are the predominant users of chronic medications and they tend to be more sensitive to prescription prices.

- **Patent Life** - The patent status influences pricing strategy. Upon introduction, many products are priced high to recover research costs during the first three years that the product is on the market. Afterwards, the price tends to be constant or decreasing, depending on the availability of therapeutic substitutes. Once patent protection has ended, the price either remains fairly constant or decreases dramatically, depending on the firm's ability to maintain the product's dominance. Prices for older products have generally "bottomed", but usually tend to increase slowly over time.

- **Price Leadership** - In most instances, the first firm to introduce a product tends to be the price leader. Other entrants into the market will normally price their product at, or below, the leader's price. Firms with less market power will tend to price their product considerably below the price of the leading brand, while other larger brand name manufacturers normally set similar prices to avoid having the other firm retaliate with lower prices in other product markets. This pattern of price leadership has deteriorated somewhat in the past decade as more brand name manufacturers have entered the generic and branded generic field.

- **Therapeutic Substitutes** - Availability of therapeutic substitutes can influence pricing levels. Chronic medication prices tend to be relatively sensitive to price differentials between therapeutic equivalents.

- **International Finance Considerations** - Since the largest pharmaceutical firms are multi-national corporations, variations in exchange rates can have a significant impact on earnings. For example, as the dollar has weakened in the currency markets over the past several years, foreign-based pharmaceutical manufacturers have been raising prices on their product lines to maintain domestic earning levels when measured in terms of the stronger foreign currency.

Marketing Strategy

Pharmaceutical manufacturers are renowned for their unique marketing practices. In addition to standard media advertising, the brand name manufacturers spend nearly $1 billion annually to send detailmen to visit physicians and provide detailed information and free samples. Non-price forms of competition are the dominant methods of competing for the retail market, although price is becoming increasingly important with the expiration of patents on major products. Major factors affecting marketing strategy include:

- Antisubstitution. A major thrust of the marketing effort has been to encourage brand name prescribing by physicians. However, the introduction of the MAC program, combined with the repeal of most state antisubstitution laws, may reduce the impact of brand prescribing. To guarantee dispensing of the particular brand, physicians now must be convinced to write "brand necessary" on their prescriptions, or the states must be convinced to convert to a prescription form that provides a convenient method for specifying "brand necessary". In either case, the necessity of brand specification is more difficult to market.

- Quality Issues. Brand name manufacturers have intensified their campaign on quality issues. Physicians and pharmacists are being warned of the dangers inherent in using a possibly inferior generic substitute and, given the increased focus on provider liability, the arguments can be quite persuasive.

- Marketing Focus. With the decline in antisubstitution the pharmacist now has greater latitude in substituting lower-priced generic equivalents. As a result, the marketing effort on multiple-source products is shifting towards pharmacists as they play an increasing role in product selection.

- Therapeutic Equivalents. As lower priced generic products detract from the sale of multiple-source products, manufacturers will attempt to convince physicians to use single-source products to treat specific diagnoses, thereby shifting physician allegiance to more profitable products.

- **Branded Generics**. Several brand name manufacturers have decided that price competition is inevitable on multiple-source products and have entered the generic market. Their products are normally priced midway between the highest brand price and the lowest generic price. These "branded generic" lines have an advantage in the marketplace because they represent a lower priced line that is backed by a high quality manufacturer. To date, the MAC prices have been set at or around the pricing level for branded generics. The growth of more branded generic lines appears inevitable.

4.1.2 Generic Manufacturers

Generic manufacturers range in size from moderately large prescription drug manufacturers who market their products nationally, to small tableting operations selling in a specific region of the country. The majority of generic manufacturers' sales are in the hospital market which is more sensitive to pricing differentials.

Adoption of the MAC program and elimination of state antisubstitution laws has provided generic manufacturers with an opportunity to penetrate the retail market. Their advertising stresses products priced at or below the MAC limit. Additionally, many of the generic manufacturers have purchased product comparability studies from independent laboratories to demonstrate that their products are equal in quality to the brand name products. Since advertising stresses good quality at a price within the MAC limit, there is a potential for an upward drift in generic product prices because being within the MAC limit is important, while being substantially below the MAC limit has little advertising impact.

4.2 Distributors

Wholesalers have been the traditional distributors of pharmaceuticals; however, other distribution systems are increasing in importance. Many large manufacturers have established a mechanism for selling directly to the retail stores, thereby circumventing the wholesaler. In addition, buying cooperatives have been established in some parts of the country to achieve lower acquisition costs.

The MAC program may have some impact on the distributors' marketing strategy. Given the increased importance of acquisition cost programs, there may be a tendency for the distributors to "inflate" prices shown on invoices, and provide off-invoice discounts or free goods to offset the inflated prices. This practice would assist pharmacists in obtaining higher reimbursements from third parties and therefore is a likely marketing strategy to be employed by distributors to increase their sales.

The eventual outcome of the competition for the multiple-source product market will affect wholesalers. If the generic manufacturers capture a substantial share of the retail market, wholesalers should experience an increase in their sales activity. Conversely, if manufacturers with large proportions of direct account sales gain control of the generic market, wholesalers will experience a decrease.

4.3 Dispensers

There are approximately 60,000 pharmacies in the United States. Nearly 25% are chain stores, while the remainder are independent retail stores. Other dispensers of outpatient prescriptions include outpatient hospital pharmacies, rural health clinics, and dispensing physicians (only allowed in certain states).

4.3.1 Independent Retail Pharmacies

The number of independent retail pharmacies has been declining for several decades. Competition from chains and lower profit margins have forced the closure of many independents. However, many pharmacy groups argue that the professional services provided by independents cannot be matched in a chain store setting and therefore that independents should be encouraged and assisted. Medicaid and other third-party payments to pharmacies generally are determined as the sum of two parts: ingredient cost reimbursement and dispensing fee. Factors affecting the reactions of independent pharmacists to the MAC-EAC program include:

- Total Reimbursement - Pharmacists are sensitive to the total dollar reimbursements received. Given that many states have traditionally adjusted dispensing fees downward to account for differences between AWP and AAC, implementation of the EAC programs without offsetting fee adjustments should decrease total Medicaid payments to pharmacists.

- Inventory Costs - The costs of maintaining an adequate inventory have risen dramatically along with prescription product prices. An additional inventory concern centers on the stocking of two or more brands of the identical product, which may occur under the MAC program.

- Professional Services - Many independent retail pharmacies provide professional services: patient profiles, counseling, 24-hour emergency service, and so forth. If costs continue to increase relative to revenue, many pharmacies consider discontinuance of these professional services an unsatisfactory response. As a result, other services, such as delivery may be dropped.

- Antisubstitution - Although most States have repealed antisubstitution laws, many pharmacies prefer to dispense the brand prescribed by the physician to avoid liability problems.

- Medicaid Participation - Participation in the Medicaid program often depends on several factors: overall reimbursement levels, payment delays, and number of Medicaid customers. Some states have experienced problems in Medicaid participation, while others have experienced sporadic, short-term boycotts.

4.3.2. Chain Stores

The factors affecting chain stores differ considerably from those affecting independent pharmacies. Chains having large front-end sales, are aggressive prescription price competitors and tend to profit from third-party reimbursement rates. The prescription department usually is located at the rear of the store and prescription prices are generally lower because of lower ingredient and operating costs. In addition, further reductions in prescription prices are sometimes offered to attract customers into the store.

Since chains have done well over the past decade, their reaction to any change normally is negative. Chains have been critical of the usual and customary provision of the MAC program because it will reduce total reimbursements under Medicaid. Fears of receiving lower ingredient cost reimbursement has caused some chains to refuse disclosure of actual invoice prices to the Federal government.

4.4 Prescribers

There are approximately 250,000 independent practicing physicians in the United States. The prescribing habits of physicians are affected by pharmacology training received in school, by the persuasiveness of detailmen, and by actions of their peers. Additionally, physicians' actions have been affected significantly by the following factors:

- Malpractice - Physicians are highly sensitive to liability issues, and hence, are concerned with product substitution and quality issues. If the FDA will guarantee the comparability of generic substitutes, thereby accepting blame for any suits arising from quality questions, then physicians are more likely to accept generic prescribing.

- Ease of Override - If physicians are provided an easy mechanism for specifying "brand necessary" (such as checking a box or signing on a specific line), the likelihood for exercising the override provision is high. Conversely, if physicians must make a conscious effort (such as writing "brand necessary"), most will not bother to use the override.

- Historical Trends - Physicians in states with a history of operating "mini-Macs" are more likely to accept the type of provisions contained in the MAC program.

4.5 Drug Program Administrators

Third-party drug program administrators operating under severe antitrust limitations cannot directly establish unilateral pharmacy dispensing fees. As a result, private third-party programs tend to follow the lead established by Medicaid programs. Ingredient cost levels and dispensing fees are therefore similar to those in public programs. As MAC gains acceptance through implementation by the Medicaid programs, the private programs may eventually follow the government's lead and adopt MAC reimbursement limitations.

4.6 Consumers

Consumer reactions to changes in prescription drug programs are influenced by several factors:

- Quality Issues - Consumers are concerned about quality issues and thus tend to sympathize with quality arguments raised by brand name manufacturers.

- Availability of Information - Most information on drug products is prepared and/or disseminated by manufacturers. Even data disseminated by physicians is likely to have been prepared by the manufacturers.

- Segment of Population - Elderly, low-income, and/or chronically ill persons tend to be prescription price conscious. On the other hand, employed individuals tend to have a relatively inelastic demand for prescriptions.

5.0 A REVIEW OF LITERATURE RELEVANT TO MAC-EAC EVALUATION

Our purpose here is to review and synthesize literature relevant to benefit-cost evaluation of the MAC-EAC program.[1] The reader is forewarned however that the substantive literature on the MAC program is pretty "thin" and is not particularly helpful to the present evaluation effort, except in suggesting evaluation issues. Although a large number of potential evaluation hypotheses are indicated in Section 2.0, almost all of the interest to date has focused on the pecuniary cost-savings potential of the MAC-EAC program--i.e., how much money can be saved and at what cost? It should perhaps also be noted that much of the literature was developed in an adversarial context and tends to be somewhat less than even-handed.

5.1 The Cost-Savings Potential of the MAC-EAC Program

Although the concept of a MAC program has been around for years, the HEW Task Force on Prescription Drugs (1969) recommended it once again after noting wide variation in manufacturer list prices on multi-source drugs. The Task Force estimated that 5-8 percent of drug costs for the elderly could be saved through a generic prescription program. However, it acknowledged that listed prices were potentially misleading, that listed prices ". . . serve merely as an umbrella beneath which actual prices are set by quantity discounts, hospital discounts, government discounts, two-for-the-price-of-one deals, rebates and other special arrangements." Nevertheless, estimates for the cost-savings to be achieved by the MAC portion of the MAC-EAC program have been largely based upon the differentials in published price. Although the

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[1] See also Jean Paul Gagnon and Raymond Jang (1979) and Drug Product Selection, a Staff Report to the Federal Trade Commission (1979).

Health Care Financing Administration (HCFA) is now obtaining information under contract with IMS America, Ltd. on invoice level prices in 1,000 pharmacies, such data have not to date been used by HCFA to reestimate the potential savings.[1] However, this has apparently been done in an undocumented study conducted by IMS America for the Pharmaceutical Manufacturers Association (see IMS, 1974). Although their results indicate some downward revision of the estimated cost-savings, it is nevertheless still apparent that substantial price differences persist at the invoice level.[2]

Only a few substantive studies bear upon the potential cost savings to be achieved by the EAC provision. The Task Force on Prescription Drugs (1969) had estimated that average wholesale prices, then used as the basis for ingredient cost by most Medicaid drug programs, overstated actual acquisition cost by an average of 15-18 percent. More recently, Joseph G. Norwood, et al., (1977) have reported that the mean differential between average wholesale price (AWP) and actual acquisition cost (AAC) was $0.56 per prescription, 17.5 percent of the mean acquisition cost. However, they also found that the magnitude of the differential varies directly with pharmacy volume and concluded that a drug program which establishes uniform prices for reimbursement discriminates against smaller pharmacies. A variety of studies have likewise found systematic variation in actual dispensing costs. For example, the 1977 fee study in California found dispensing costs to range from $1.00 per prescription to more than $5.00 (Harris and Donnally, p. 32).[1]

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[1] It is, however, being used to assess the desirability of setting individual MAC's.

[2] Several studies--e.g., Richard A. Horvitz, et al. (1975) and Ashok K. Gumbhir and Christopher A. Rodowskas (1974)--purport to investigate actual consumer price differentials between generic and brand name prescriptions and find less consistent evidence for cost savings. However, such finding is largely a "red herring" inasmuch as generic prescriptions are often filled by the more expensive brand name products--or at least are not filled by the lowest-price generic equivalent that is widely and consistently available. On the other hand, Harvey Wolfe (1973) found that purchasing of the lowest-price generic equivalents would save only 3.5 percent of the total drug cost in hospitals. Whereas we believe that Wolfe has under-estimated the potential cost-savings, inasmuch as he takes the list price for the lowest-priced generic equivalent, his general finding that the cost-savings potential in hospitals is not as large is probably correct. This happens because hospitals can purchase brand name drugs at costs substantially lower than list price. It is unlikely that similarly large discounts would be available on the lower-priced generic equivalents. However, it should also be noted that multisource drugs accounted for only 17 percent of total hospital drug costs in Wolfe's study. No doubt this figure is much higher now due to patent expiration (see Table 3-1) and will continue increasing in the near future.

5.1.1 The Inflation Impact Statement and the Trapnell Study

Prior to actual implementation of the MAC/EAC program two major evaluations of the prospective benefits and costs were conducted, one prepared by the Federal government--the DHEW Inflation Impact Statement--and the other prepared for the pharmaceutical industry--the Trapnell study. Both studies focus almost exclusively on the pecuniary cost-savings potential.

The DHEW Inflation Impact Statement (1975) estimated that if MACs had been in force for the most common multi-source drugs--32 out of 55--the savings in drug cost would have been $37.2 million in fiscal year 1975.[2] It was likewise estimated in the Statement that the EAC provision of the MAC program would have saved $23.1 to $38.4 million in fiscal 1975.[3] Federal administrative costs were put at $1.4 million; and state administrative costs were estimated to be $3.5 million in the first year and $0.3 million annually thereafter. The total net savings was projected to range between $55.3 and $70.8 million. See Table 5-1.

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[1] See Colman M. Herman and Edward J. Zabloski for a review of dispensing fee literature.

[2] The IMS study had estimated that pharmacy acquisition costs for 33 multisource drugs would be reduced by $17 million per year, or 24 percent of the government outlay for these drugs.

[3] The initial HEW estimates of MAC-EAC cost savings were somewhat higher ("MAC's here," 1974).

Gordon R. Trapnell (1975) conducted an independent evaluation of the prospective MAC program for Eli Lilly and Company and came up with an altogether different assessment. In fact, Trapnell concluded that the MAC portion of the MAC-EAC program would actually increase costs. See Table 5-2. However, consider the differences in methodology. First, Trapnell's estimate for the percentage savings was developed from IMS invoice data on just eight frequently prescribed multiple source drugs. Even if the sample were representative, and we have no reason to suggest otherwise, the error of estimate for the percentage savings figure would be very high because of the small sample size--i.e., the estimated cost savings would be unreliable. However, perhaps more importantly, Trapnell used an extremely conservative criterion in projecting the MAC price levels. In particular, Trapnell assumed that the less expensive generic alternative must have at least 25 percent of the market, unless the price differential is small. Recent experience with the MAC program suggests that this restriction is inappropriate. Trapnell also made several ad hoc and questionable assumptions that reduce the savings estimate to 67 percent of the price spread--e.g., a significant supply shortage is judged to occur with respect to reserpine and the savings estimate is reduced by one-third. Finally, Trapnell assumed that 37 percent of physicians would certify brand necessary and the cost savings estimate was reduced accordingly. This assumption is also not supported by the program

Table 5-1: Estimated Savings and Costs, FY 1975 (in millions)

	Minimum Estimate	Maximum Estimate
Total Savings	$60.2	$75.6
Federal Savings		
MAC Program	22.7	22.7
EAC Program	12.2	20.3
Total Federal Savings	$34.9	$43.0
Less: Federal Administrative Costs	1.4	1.4
Net Federal Savings	$33.5	$41.6
State Savings		
MAC Program	14.5	14.5
EAC Program	10.9	18.1
Total State Savings	$25.3	$32.6
Less: Administrative Costs	3.5*	3.5*
Net State Savings	$21.8	$29.1
Total Net Savings	$55.3	$70.8

* This is a figure for the first year. After the initial costs have been incurred, State administrative costs decline to $300,000 per year.

Source: USDHEW, Inflation Impact Statement, 1975.

experience to date; the percentage of prescriptions with physician certification is said to be only a few percent. We conclude that Trapnell's estimate for the cost savings--the reduction in benefit payment on line 1 in Table 5-2--is biased downwards considerably and that, on balance, the Inflation Impact Statement gives a better "ballpark" estimate for the potential cost savings. Nevertheless, it must also be conceded that the Impact Statement over-stated the cost savings potential for a variety of reasons: (1) the cost-savings estimates were based upon the differentials in list price; (2) the study does not take account of states already having MAC programs--states accounting for about 20 percent of all Medicaid expenditures; (3) there is no allowance for physician "over-ride" or brand necessary certification; and (4) some of the multisource drugs had potential bioequivalency problems.

Consider now the other costs that Trapnell attributes to the MAC program. (1) Trapnell assumes that the reduction in drug expenditure is offset by a 42 percent loss of tax income to Federal, state and local governments. This assumes that the entire expenditure reduction comes from profit. However, even if Trapnell's estimate for the tax loss were correct, it is not a cost that should be attributed to the program. Taxes are merely transfer payments within the society at-large and do not represent a real cost from the taxpayers perspective.[1] (2) Trapnell indicates higher estimates for the cost of administering the MAC program--see lines 3, 4 and 6. It is not possible at this time to evaluate the reasonability of his underlying assumptions. In any event, the difference between Trapnell's estimate and the one given by

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[1] See E. J. Mishan (1971).

Table 5-2 Summary of Estimated Impact of MAC Program on Net Federal and State Spending

(Millions of 1975 Dollars)

	1976	1977	1978	1979	1980	1981
1. Reductions in benefit payments under service programs*	$ 0	$ -9.2	$ -10.4	$ -13.0	$ -14.7	$ -16.6
2. Reduction in Federal and state income taxes*	0	+3.9	+4.4	+5.5	+6.2	+7.0
3. Administrative costs of the MAC program	+1.0	+2.0	+2.2	+2.4	+2.7	+3.0
4. Regulatory costs associated with the MAC program	+4.4	+5.0	+5.5	+6.0	+6.5	+7.0
5. Increase in cost of state administration of Medicaid	+.3	+.5	+.5	+.5	+.5	+.5
6. Increase in Federal agency administrative expenses	0	+.7	+.7	+.7	+.7	+.7
	$ +5.7	$ +2.9	$ +2.9	$ +2.1	$ +1.9	$ +1.6

*Income to manufacturers is estimated to be reduced by the net of lines 1 and 2

Source: Gordon Trapnell, 1975.

the Inflation Impact Statement is not so large as to dominate the overall evaluation.[1] (3) Trapnell estimated that the MAC program would entail $4.4 million in added costs to the FDA for bioequivalence testing and quality assurance in 1976 and somewhat larger cost increments in subsequent years. The Inflation Impact Statement maintains that these activities would have been undertaken anyway and therefore do not represent a cost to the MAC program. This essentially involves a judgement call and we do not have sufficient information to make it at this time. At least, Trapnell does not make a persuasive case for including the FDA costs.

Trapnell also evaluates the EAC provision of the MAC program; see Table 5-3. He basically assumes that there is no money to be saved--i.e., pre-EAC price levels fairly reflect the costs of doing business--and that in the short-run losses of income due to EAC will simply be passed on to the general public in the form of higher prices for non-Medicaid prescriptions. However, in the long-run (five years) Trapnell assumes that pharmacies will organize and re-negotiate the earlier price levels for Medicaid reimbursement. Whereas there is merit to Trapnell's scenario, we do not have sufficient information to evaluate its likelihood at this time. On the other hand, the Inflation Impact Statement assumes that any dispensing fee changes due to the mandated cost studies ". . . are the result of improved information and more rational fee setting by State authorities and are not properly attributable to the MAC program per se." (p.24) This is not correct. If dispensing fee levels can be shown to increase in response to reduced reimbursement for ingredient cost, it is a cost properly charged to the program.[1] Even so, the Inflation Impact Statement itself indicates considerable uncertainty about the level of cost savings to be achieved by EAC, giving both minimum and maximum estimates.[2] In our judgment, societal evaluation of EAC depends largely upon the adequacy of former dispensing fee levels and the extent to which dispensing fees are increased in response to EAC. In any event, the administrative cost figures given by Trapnell seem rather high.

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[1] The Warner Chillicott Company (1975) also developed estimates of MAC program administrative costs; however, these estimates pertained to the initially-planned actual acquisition cost (AAC) program and are not relevant to the finally-promulgated EAC-type program.

5.1.2 The Mini-MAC Studies

Several studies of state "mini-MAC" programs are also germane. Consider first Eli Lilly and Company's 1977 analysis of California's MAIC program. This study gave some evidence that MAC-type regulations act as a floor under prices as well as a ceiling, that manufacturers tend to raise prices to the MAC level.[3] However, the finding most touted in the Lilly study was that California and Tennessee--the two best known states having mini-MAC programs--have experienced more growth in drug expenditure per eligible than have Texas and Indiana--two states not having MAC-type programs. It was further shown that increased utilization and eligibility account for 78

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[1] Robert L. Harris and Bernard P. Donnelly (1977, p. 24) report that the California Department of Health "... increased the fee on March 6, 1977 from $2.86 to $3.08 per prescription, an amount calculated to offset the loss to pharmacies arising from imposition of EAC controls on that data." Furthermore, as reported in Gagnon and Jang (p. 58), the frequency and average size of dispensing fee increases have both increased two-fold since implementation of the MAC program.

[2] It is arbitrarily assumed that the cost of ingredient cost will be reduced by at least 9-15 percent since the Task Force on Prescription Drugs found that the average overstatement from AWP is 15-18 percent.

[3] Harris and Donnelly (p. 45) similarly suggest that California pharmacies with large Medicaid sales tend to raise their "usual and customary" or general retail prices to the Medicaid ceilings. However, the evidence presented by them is not persuasive. It does not preclude alternative explanations--e.g., the Medicaid pharmacies may be inherently more expensive.

Table 5-3 Summary of Estimated Impact of EAC Program on Federal and State Spending

(Millions of 1975 Dollars)

	1976	1977	1978	1979	1980	1981
1. Reductions in outlays for acquisition costs*	$ -12.0	$ -52.0	$ -81.0	$-114.0	$-119.0	$-125.0
2. Increase in dispensing fees*	+6.0	+32.0	+64.0	+100.0	+117.0	+129.0
3. Additional state administration expense to set EAC's and dispensing fees	+6.4	+5.7	+5.7	+5.7	+5.7	+5.7
4. Increase in administrative expenses related to claim processing	+.8	+.2	+.2	+.2	+.2	+.2
5. Federal administrative expenses for the EAC program	+.6	+.7	+.7	+.8	+.8	+.9
	$ +1.8	$ -13.4	$ -10.4	$ -7.3	$ +4.7	$ +10.8

*Income to pharmacies is estimated to be reduced by the net of lines 1 and 2

Source: Gordon Trapnell, 1975.

percent of the growth in California's total drug expenditure under Medi-Cal. The Lilly study thereupon concludes that:

> (1) MAC-type regulations have proven ineffective in achieving their objective to lower drug costs.
>
> (2) Even if HEW's estimated savings for MAC materialized . . ., these savings could represent an insignificant financial benefit in the face of potential financial problems in other parts of the Medicaid program not even touched by the MAC regulations. (p. 12)

While the weight of evidence given supports both statements, they are also potentially misleading. The purpose of a MAC program is to contain the per-unit cost of drugs and indeed the Lilly study finds that the cost per unit of medication has increased only 4.5 percentage points under California's MAIC program. However, the cost savings due to such price-level restraint has been overwhelmed by cost increases due to increased utilization. Inasmuch as MAC-type programs were never designed to contain utilization--nor has any such causal relation to utilization ever been hypothesized--we must conclude that cost increases would have been even greater in the absence of the MAIC program. Turning now to the second point, the fact that the Medicaid program also confronts other financial problems does not in any way affect evaluation of the MAC program per se. It merely suggests that MAC can not be relied upon as the only mechanism for drug cost containment and that, for example, utilization controls are also important.

The following are indicated as conclusions elsewhere in the Lilly study:

> ". . . MAC--where tried in various states--has failed to control cost increases in Medicaid drug programs." (p. 2)
>
> "It has been shown that MAC price constraints can reduce the effectiveness of the pharmaceutical industry and retail pharmacy." (p. 31)

No evidence is given to support these assertions.

Stephen G. Sudovar, Jr. and Susan D. Rein (1978) have conducted a more extensive analysis of cost differences between the Medicaid drug programs in California and Texas. Their study for Roche Laboratories finds that the ingredient cost per claim is 8.0 percent lower in California than in Texas--$3.68 and $4.00, respectively. However, Sudovar and Rein note that this cost differential is not necessarily due to California's MAIC program, that their study has not controlled for prescription size and that California's more restrictive formulary limits the use of some widely used but more expensive drugs. Sudovar and Rein also observe that the professional fee is $0.17 higher in California than in Texas--$2.13 vs. $1.96. Whereas the higher professional fee partly offsets the ingredient cost savings, it is not clear that the two are causally-related; it may or may not be that the program must pay higher fees to pharmacies in order to compensate for the limitations on ingredient cost reimbursement. The fee differences may, for example, simply reflect the general pattern of wage differences between the two states. Sudovar and Rein likewise note that the drug utilization rate is higher in California than it is in Texas and they estimate that the administrative costs in California are $0.17 higher per claim--$0.46 vs. $0.29. Thus, on balance, it is found that the California drug program is more expensive per recipient than the Texas program, and Sudovar and Rein conclude as follows:

> . . . it can reasonably be stated that the original hypothesis [that more stringent regulatory controls will result in reduced costs] is tenuous at best. Implementation of complex regulatory programs intended to control access to drugs and/or drug prices does not necessarily lead to lower overall drug program expenditures. (p. 15)

This is much the same as the conclusion from the Lilly study and can be as easily misconstrued--and has been. It does not say that drug program costs would have been less without MAIC and other controls in California; nor does it say that the cost would not have been greater in the absence of these controls. Even so, the entire conclusion rests on the questionable assumption that the drug utilization rate is higher in California due to that state's more stringent regulatory controls. California actually had a lower cost per claim--$5.71 vs. $5.96--a more relevant criterion for ascertaining the cost savings due to the MAIC program inasmuch as the program was not meant to control utilization.

The Sudovar and Rein study raises questions that cannot be reliably answered from "case study" comparison of just a few states. Because of the enormous heterogeneity in state drug programs, reliable inference from state-to-state differences would depend upon having a large sample of states and/or controlling more fully for the relevant differences between states.[1]

The Tennessee Medicaid program has conducted a modest study of its mini-MAC program and projected reimbursement savings in excess of $800,000 for 1975-1976. The study did not estimate the administrative costs; however the costs of bioavailability testing are known to be $130,000 per year.

5.2 The Meager Evidence for Other Hypotheses

There can be little doubt but that there is a substantial (net) cost savings to be achieved by at least the MAC portion of the MAC-EAC program. However, it was also widely agreed that the MAC program may have certain indirect effects that either can not be easily predicted or, if predictable, can not be easily valued for benefit-cost purposes. The following were noted as potential indirect effects in the Inflation Impact Statement:

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[1] This will not be so much a problem in the present study inasmuch as inference rests largely upon the pattern of changes over time within the same state.

- physicians may begin prescribing the lower-priced generics for all patients, not just for their Medicare and Medicaid patients;
- MAC may lead to a reduction in drug research and development;
- the price advantage gained by larger discounts due to larger volume purchasing would be neutralized by EAC--e.g., smaller pharmacies would receive relatively greater reimbursement for ingredient cost;
- pharmacies may have to maintain a larger inventory; and
- "call backs" for physician authorization to substitute will be required in states having anti-substitution legislation.

None of these prospects were actually explored in the Inflation Impact Statement.

Trapnell and others have noted further areas of potential impact that may affect evaluation of the program:

- price increases on non-Medicaid prescriptions;
- price increases on single-source drugs;
- non-participation by pharmacists (i.e., refusal to accept Medicaid reimbursement);
- pharmacy losses on Medicaid prescriptions;[1]
- reduction in pharmacy services (e.g., free delivery or drug counseling);
- pharmacy closings; and
- increased health risk due to lack of bio-equivalence or poor quality control in manufacturing of lower-priced generics.

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[1] Vince Gardner, former director of the MAC program, was among those expressing concern that pharmacist fees would be unfairly limited by state fiscal constraints.

The bio-equivalence/quality issue received considerable attention at the time of MAC program inception. However, over the last several years the industry argument has lost much of its merit, because of the entry by major companies into the generic market and by the FDA's development of new Good Manufacturing Practice (GMP) requirements and bioavailability regulations.[1]

More recently, product availability has emerged as a concern and as an intervening variable that might affect evaluation of the MAC program. For example, a MAC was set on chlordiazepoxide HCl at a price well below that being charged by Roche for Librium, the brand name product, even though Roche's product represented 99 percent of the market. Roche unsuccessfully challenged PRB's contention that chlordiazepoxide HCl would be "widely and consistantly available" at the MAC price level.[2] Earle W. Lingle, Jr. and Jean Paul Gagnon (1978) audited a sample of 75 nonchain pharmacies in North Carolina soon after promulgation of the initials MACs--between December 1977 and July 1978--and found that only 13.3 percent of the pharmacies had any 5 mg. chlordiazepoxide in stock that had been acquired at or below the MAC cost level. Availability of inventory at the MAC prices was somewhat less serious a problem for other strengths and other MAC products--see Table 5-4. If such availability problems persist indefinitely, the presumptive equity and efficacy of the MAC program would be seriously undermined. However, the problem is probably less severe in states which have abolished their anti-substitution laws.

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[1] See Section 3.0 for further discussion.

[2] Large pharmaceutical manufacturers assured PRB that they could satisfy the market requirements, given 60 days lead time.

Table 5-4

Breakdown of Pharmacies with at Least One Stock Bottle in Inventory at or Below MAC Levels

Drug Product	Number of Pharmacies (n=75)	Relative Frequency
Ampicillin 250mg	60	80.0
Ampicillin 500mg	59	78.7
Penicillin VK 250mg	41	54.7
Penicillin VK 500mg	34	45.3
Penicillin VK 125mg/5ml	49	65.3
Penicillin VK 250mg/5ml	50	66.7
Tetracycline 250mg	62	82.7
Tetracycline 500mg	34	45.3
Propoxyphene 65mg	24	32.0
Propoxyphene 65mg w/APC	17	22.7
Chlordiazepoxide 5mg	10	13.3
Chlordiazepoxide 10mg	19	25.3
Chlordiazepoxide 25mg	15	20.0

Source: Earle W. Lingle, Jr. and Jean Paul Gagnon, 1978.

Only a few studies that bear directly on other MAC-impact hypotheses have been found. Recall from Section 2.0 that changes in manufacturer pricing strategy were hypothesized. Paul F. Dickens, III and Timothy D. Hogan (1977) analyzed the pattern of drug price increases during the 1970's and reported no indication that the higher rates of price increase since 1974 have been due to the MAC program. We accept their analysis as far as it goes, but do not view the issue as being altogether closed to further investigation. Of course, the particular pricing response considered by Dickens and Hogan was only one of many that might be hypothesized.

It is also hypothesized in Section 2.0 that MAC may affect the industry's research and development activities. Paul Dickens (1976) gave brief theoretic attention to this issue. Dickens considered three alternative models and reported that each suggests a different conclusion. One model indicated an adverse effect, another suggested little effect and the third implied that MAC is an impetus to greater R & D effort. Dickens thereupon concludes that the effect can only be determined empirically.[1] This question receives more attention in Section 6.0.

5.3 Conclusion

As the reader has seen, the so-called MAC evaluation literature is quite fragmentary and does not provide much guidance to the present study.

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[1] Drug Product Selection, a Staff Report to the Federal Trade Commission, summarizes three unpublished economic studies commissioned by the FTC to investigate the potential effects of generic prescribing on new drug innovation. We have not yet seen these studies; they will be reviewed in our Final Report, upon completion of Phase II. The FTC study concludes that, "The three analyses we obtained indicate that some negative impact upon R&D might result from removal of these laws, but only one concluded that the impact would significantly lower the industry's expected rate of return on R&D" (p. 231).

This should not be too surprising. The MAC program has just begun and this study will be the first to actually evaluate experience with the nationwide program.

Finally, it should be mentioned that Mark Hornbrook and John Rafferty (1977), and Applied Management Sciences, Inc. (1978) also prepared methodologies for evaluating the MAC program. However, these alternative approaches were much too expensive to apply within the present study.

6.0 THE HYPOTHESES AND CONCEPTUAL PERSPECTIVE FOR MAC EVALUATION

Our purpose in this section is threefold: (1) to understand and explain the MAC program conceptually; (2) to model the behavior of various actors in the context of the MAC program; and (3) to develop hypotheses concerning the cost and other effects of the MAC program. This theoretic-type discussion is broad-ranging and goes beyond the more limited set of hypotheses that can be tested within the limitations of this study.

As already seen, the so-called MAC program is actually comprised of three related and yet somewhat independent components: (1) maximum allowable cost (MAC) limits on reimbursement of ingredient cost for multisource drugs; (2) estimated acquisition cost (EAC) plus dispensing fee limits on reimbursement; and (3) dissemination of drug price information. All of these were motivated by a general concern about the apparent lack of competitive conditions in the drug industry, especially the pattern of wide and seemingly inexplicable variation in drug prices. However, the conceptual rationale and hypotheses for each are different.

The underlying assumption of the MAC-EAC program is that:

> The societal benefits of the MAC-EAC program exceed the societal costs.

This is certainly a hypothesis we should like to test. However, it will not be possible to reliably measure, much less value all potential benefits and costs of the MAC-EAC program. Attention must rather focus on more limited or partial hypotheses. As a research strategy, it is more fruitful to isolate the impact of MAC on the different interest groups and to test specific hypotheses about their behavior. Consequently we will discuss in turn the likely impacts of the MAC program upon (1) the government, (2) drug manufacturers, (3) retail pharmacists, (4) physician prescribers, and (5) consumers.

6.1 Hypotheses Concerning the Impact of MAC on the Government:

It is hypothesized that:

> The governmental benefits of the MAC program exceed the governmental costs.

That is, it is hypothesized that the savings in reimbursement cost will exceed the administrative and other program-related costs. This is the main hypothesis to be tested in the present study.

Although the MAC program applies to both inpatient and outpatient drug programs, the potential for discovering any measurable impact in a hospital setting is slight. Hospitals tend to employ competitive bidding in their purchases of drug products and normally receive ingredient cost prices that are consistently below any MAC or EAC upper limit. On the other hand, government reimbursed prescriptions dispensed by retail pharmacies are directly affected by the MAC program. The principal government-reimbursement programs having at least some drug coverage are Medicare, Medicaid and the Public Health Service programs. However, Medicare reimburses only for prescriptions dispensed to patients in hospitals and long-term care facilities. Almost all Medicaid programs cover ambulatory patients as well as hospital and long-term care patients. Public Health Service programs have similarly broad coverage but the aggregate program size is comparatively small. Consequently, the out-patient Medicaid program will reflect the largest part of any governmental cost savings due to the MAC-EAC program.

6.2 Hypotheses Concerning the Impact of MAC on Drug Manufacturers

The pharmaceutical manufacturing industry is commonly portrayed as a price discriminating oligopolistic industry in which advertising or promotion is heavily used to differentiate the products, by focusing on minor product differences, and thereby avoid price competition. The marketing of "brand name" drugs in a generic market can be seen as an extreme case of such product differentiation. The manufacturer typically dwells on therapeutically irrelevant differences (e.g., taste, packaging and dosage form) but, more importantly, emphasizes its more stringent manufacturing and quality standards. A physician, acting as consumer agent for his patients, cannot easily assess whether or not such "quality" differences are therapeutically significant--i.e., whether or not the quality issue is even relevant. Thus, a physician may understandably prescribe a higher-priced brand name to protect his patients from the uncertain risk entailed by a potentially lower quality generic equivalent. The physician may "trust" the manufacturer, either on the basis of satisfactory experience with the manufacturer in the past or on the basis of the manufacturer's general reputation, visibility and exposure to scrutiny.[1, 2]

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[1] Brand name familiarity is an additional factor that may explain lack of price competition in generic markets. The chemical or generic names are typically lengthy and unpronounceable whereas brand names are by design more tractable and memorable, in addition to being more prominently exhibited in promotion of brand name products. Furthermore, multisource drugs are largely known and prescribed by brand name while still under patent and tend afterwards to be referred to by brand name when the generic class is meant--in much the same way as "kleenex" is used to refer to tissue paper and "scotch" tape is used in reference to cellophane tape. In fact, a study by Horvitz, Morgan and Fleckenstein found that physicians could correctly identify only 14.1 drugs out of 22 as having a generic alternative.

[2] This informational problem is apparently less severe for pharmacists. The FTC report Drug Product Selection recently concluded after reviewing four studies on the subject that, "Separately, these studies may not be conclusive, but their consistant findings indicate that although pharmacists' knowledge is not perfect, they are more competent than MDs in drug product selection."

The central tenet of MAC reimbursement is that all products within most generic classes are therapeutically equivalent, as attested by the Food and Drug Administration (FDA), and that product selection for government patients can be based on price only. That is, except for certain dosage forms, non-price differences within generic class are deemed to be irrelevant. The government limits reimbursement of ingredient cost to the price level of the lowest price generic alternative that is "widely and consistently available from any formulator or labeler." To the extent that these low price generic equivalents were in fact stocked by pharmacies prior to MAC implementation--i.e., were widely and consistently available from the providers--the government is merely choosing, as a prudent buyer, to purchase what it perceives to be a homogenous commodity at the lowest price available.[1] As such, the government is not exercising any incremental market power, given the cost plus fee basis for reimbursement.[2] To the extent that the low price generics were not formerly available, the government is exercising at least some additional market power.[1] In such cases, participating pharmacies would either have to dispense a higher cost product at the lower reimbursement level or incur additional inventory and other transaction expense in stocking the lower cost product.

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[1] The MAC concept depends importantly upon the existence of "workable competition" in the drug market--i.e., that normal market forces can be relied upon to determine MAC price levels. In consequence, the MAC program is not--as some have suggested--a viable model for cost containment under national health insurance. A competitive market would cease to exist if all multisource drugs were reimbursed under a MAC-type arrangement. Reimbursement price levels would necessarily have to be determined by a competitive bidding process. However, this does not preclude the application of the "maximum allowable cost" price limiting approach to reimbursement of other health care services provided to public patients (e.g., eye glasses).

[2] This would not be true if the pharmacy "profit margin" on ingredient cost--EAC or MAC minus AAC--were higher on the brand name product than on the generic.

The key hypothesis concerning the impact of MAC on the drug manufacturers is the following:

> MAC reimbursement policies will lower overall profitabilty or net earnings in the pharmaceutical industry.

6.2.1 Pricing Strategy

Drug manufacturers can naturally be expected to change their marketing and pricing strategies in response to the MAC program. Possible forms of pricing response are now considered.

> MAC reimbursement of multisource drugs may lead to greater price competition in multisource markets and result in lower average prices (and therefore cost savings) for private as well as public patients.

Unfortunately there are no generally accepted models of oligopolist behavior. Nevertheless, it is possible to make the "weak" assumption that, *ceteris paribus*, a greater profit and greater market share are preferred to a lesser profit and lesser market share. Consider the expression below for the change in profit ($\Delta\pi_i$) due to the *i*th manufacturer reducing its price (P_i) to the MAC price level (P_{MAC}):

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[1] Although such exercise of the considerable public market power is commonly perceived as a form of regulation, it is not regulation in the technical sense inasmuch as it does not involve coercion. Pharmacies have the option of participating or not participating in the Medicaid drug programs and dispensing or not dispensing prescriptions according to the Medicaid price schedule and consistent with other program conditions. As such, the Medicaid drug programs are not formally different from the nongovernmental third-party plans and depends upon the same normal market forces that the United Federation of Teachers in New York City used in negotiating lower prices for its members. ("Use of Consumer Leverage to Reduce Prescription Costs...," *American Druggist*, November, 1976, p. 17.)

$$\Delta\pi_i = [P_{MAC} \cdot (Q^i_{public} + Q^i_{private})] - [P_i \cdot Q^i_{private}] - [VC \cdot Q^i_{public}]$$

The manufacturer gains no substantial advantage by reducing its price to a level above the MAC price level. However, at the MAC price level--P_{MAC}--the manufacturer would have some portion--call it Q^i_{public}--of the public market share. We assume, for the sake of convenience that private sector demand is highly inelastic with respect to price and remains unchanged at $Q^i_{private}$. The expression thus gives the change in revenue due to the price reduction less the cost of expanded output, where VC is the variable cost per unit. This expression must be greater than zero for a manufacturer to make the price reduction. This implies that the following must hold:

$$(P_{MAC} - VC) - Q^i_{public} > (P_i - P_{MAC}) \cdot Q^i_{private}$$

That is, the net revenue from the public market must exceed the revenue lost in the private market. This further suggests several additional hypotheses:

> The likelihood that a manufacturer will reduce its price to the MAC level varies inversely with the magnitude of the price differential itself--i.e., prices are less likely to be reduced for the highest price brand name products.
>
> The likelihood that a manufacturer will reduce its price to the MAC level varies directly with the expected ratio of government to private market share--i.e., ceteris paribus, a manufacturer having a smaller share of the private market is more likely to reduce its price.

These hypotheses cannot be easily tested from the data being collected in this study. However, they could be readily tested from the drug price data being obtained from IMS America by the Office for Pharmacy Reimbursement.

Nevertheless, it might be difficult to disentangle the effects of MAC from the effects of other recent developments that also tend to promote price competition in generic markets, including (1) the passage of substitution laws in many states, (2) the general trend toward more aggressive price advertising by pharmacies, and (3) the effects of the forthcoming drug price-book. All of these may be said to increase the price elasticity of demand in the private market. In addition, the exogenous increase in size of the generic market due to patent expiration and entry of brand name manufacturers into the generic market has apparently led to increased supplier competition.

Price effects are not necessarily limited to the multisource market. In particular, a well-known principle of optimal pricing in oligopolistic markets, those markets in which the quantity-demanded is not completely elastic with respect to price, holds that a larger share of fixed cost should be allocated to products having more inelastic demand.[1] That is, the optimal "mark up" is higher for those products for which the quantity demanded falls off less rapidly with increasing price. The substantial research and development costs in the pharmaceutical industry are financed in this fashion and account for a large portion of the differential between brand name and generic prices (e.g., see Mark A. Schankerman). MAC reimbursement can be viewed as increasing the elasticity of demand for multisource drugs relative to single-source entities. Thus, optimal pricing policy implies a relatively greater allocation of research and development costs to single-source drugs, and we therefore hypothesize that:

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[1] See Armistead M. Lee, pp. 133-38 for a non-technical explanation.

MAC reimbursement of multisource drugs will lead to absolute price increases for single-source products.[1, 2]

Whereas this hypothesis will be tested from the data being collected, it could take some time for the industry to adjust its pricing policies and the full effects might not become apparent in the time frame of this study.

A related hypothesis has been suggested and briefly investigated by Paul Dickens and Timothy Hogan. In particular, the demand for multisource drugs is more elastic after implementation of the MAC program than before. Thus, announcement of the MAC program in 1975 meant that the elasticity of demand for multisource drugs in the future would become relatively more elastic than demand in the present. Optimal pricing would therefore imply a relatively greater allocation of accumulated research and development costs to the interval of time between announcement of the program and its implementation. That is, it can be hypothesized that:

Announcement of the MAC program caused anticipatory increases in the price of drugs.

It is doubtful that this hypothesis can be meaningfully tested inasmuch as the effect of MAC's announcement was confounded with the effect of ending Economic Stabilization Program (ESP) price controls. At least, Dickens and

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[1] This assumes that the brand name drug manufacturers have some degree of unexercised market power--that they are not "profit maximizers" but rather "profit satisficers."

[2] This reasoning also suggests that prices may be increased on the brand name multisource drugs still sold to private patients. If so, the effect is assymetrical. As hypothesized above, there is an incentive for generic manufacturers to lower prices and the incentive is larger the closer is the manufacturer's price to the MAC price. However, this analysis suggests that if the price is not lowered to the MAC level and a manufacturer has lost sales as a consequence, there is then an incentive to raise the price of the MAC'd product. However, any such effect could be easily "swamped" by the many forces moving toward generic prescribing in the private sector.

Hogan could find no evidence for the hypothesis. It is probably not worth pursuing any further.

To the extent that a reduction in the "profit margin" on multisource drugs is offset by increases in the "profit margin" on single-source drugs, the estimated savings in reimbursement cost will over-state the "true" social benefit.[1] That is, to the extent that the industry can shift its earnings loss back to the consumer, both public and private, the cost-savings objective of the MAC program is partly thwarted.

The pricing and marketing strategies of drug manufacturers are closely related. Therefore consider the impact of MAC on the manufacturers' marketing strategy.

6.2.2 Marketing Strategy

The impact of MAC on advertising or promotional expenditures depends entirely upon the relative credibility of the manufacturers and the federal government. We hypothesize that:

> Manufacturers will initially increase promotional expenditures for MAC'd products in order to persuade physicians to indicate "brand necessary."

If this short-run strategy is not successful, we may expect that:

> In the longer-run manufacturers will spend less money in promoting MAC'd products, especially among physicians that tend to serve Medicaid patients.

Finally, in order to maintain higher mark-ups on single-source products, as hypothesized above, or expand the relative size of the single-source market it seems likely that:

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[1] We define "profit margin" or net earnings to include accounting profit plus the R&D expenditure level, excluding market research.

> Manufacturers will increase promotional expenditures for single-source products, especially products that are close substitutes for MAC'd products.

This also suggests the corrollary hypothesis that, ceteris paribus:

> The relative market share of single-source products will increase.

Only the corollary is being tested in the present study.

6.2.3 Research Strategy

The likely impact of generic substitution on industry research and development activity has already received some discussion (e.g., see Paul Dickens and *Drug Product Selection*, Ch. IX). We believe that it is first necessary to distinguish two types of R&D activity: (1) "new" product innovation and (2) "old" product modification. The first of these is more "basic" and is directed toward the discovery and development of a substantially different product, especially one for which there is not already a close therapeutic substitute. The latter kind of research is oriented toward modifying an existing product in order to gain minor improvements in efficacy or reductions in side effects that can be touted in promotion, but also to compound chemically distinct entities that can be patented and compete as substitutes for either a competitor's single-source product or as substitutes for a no longer profitable multisource product--e.g., substituting Darvon-N for Darvon.[1] The economic literature (e.g., William S. Commanor) suggests that such activity tends to be less valuable to society-at-large than it is for the firm itself and therefore that expenditures for such purposes are excessive. The MAC reimbursement program lowers the profit margin on multisource drugs and thereupon increases the incentive to modify existing multisource products in such a way as to develop substitutes that can be patented and marketed without being subject to MAC price limitations.[1] It is therefore predicted that:

---

[1] Whereas major "new" products are sometimes found in the process of "old" product modification, we assume that the research and development process is not altogether serendipitous and that the two R&D objectives can be usefully differentiated.

> MAC reimbursement of multisource drugs will lead to an increase in research and development expenditure for "old" product modification.

It seems that it will not be possible to test this hypothesis in the near future inasmuch as we are unlikely to obtain current information on the industry's allocation of R&D funds. However, it can be tested indirectly in the longer run by monitoring the pattern of new drug applications to ascertain whether or not there has been an increase in the relative number of multisource drug substitutes being introduced.

Now consider the impact of MAC on the R&D expenditure level for "new product development," the type for which there is a greater presumption of social worth. The government grants exclusive patent rights for a period of 17 years on all technical innovations, including drugs, to enable the innovator to recoup the costs of research and development. During this interval of patent protection a drug manufacturer sets the price in excess of "marginal cost" in order to obtain a return on its R&D investment and is legally protected from direct competition, although competition may be indirect with competitors marketing products that are close therapeutic substitutes. However, because of "brand recognition" and "habit persistence" factors, brand name products usually continue earning an excess return after expiration of patent and entry of direct generic competition. Thus, the MAC reimbursement policy can be seen as a decision by the government to discontinue paying a return on R&D after patent expiration.[1] This implies an unambiguous reduction in the profitability of R&D investment for new drug development. However, the effect may or may not be a "large" one.

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[1] Of course, if the government were to set MACs for a broader therapeutic class, encompassing all entities that are close therapeutic substitutes, this incentive would be removed.

Consider the following hypothetic example in illustration. Assume that, prior to MAC, a new product would earn a fixed amount per year in excess of production and promotion costs for each of the first ten years on the market, and that it would earn half that amount per year for a second ten years, and nothing thereafter. It may still continue to be marketed after 20 years but prices will have been driven down to the cost level[2]. Further assume that the effective patent life is really 13 years and therefore that it is off patent for the last seven years of the product's 20-year commercial life. MAC reimbursement implies that no "excess profit"--or return to R&D--would be earned from government-reimbursed patients during the seven year interval the product is off patent. If government prescriptions account for 25 percent of the retail pharmacy market and the proceeds are discounted to the future at 8 percent per year, the present value of the earnings stream is reduced by only 2.9 percent. The reduction would have been 4.9 percent if the earnings stream had not been halved during the second ten years.[3]

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[1] There are some exceptions. MAC reimbursement limits are being set for those patent-protected drugs available, due to licensing, from more than one source. This creates a significant incentive to discontinue licensing in the future.

[2] For the sake of convenience, this hypothetical example assumes zero profits. Many older products clearly contribute positive profits to drug companies.

[3] As already noted, a portion of this reduction in earnings potential may be made up by an increase in price while still under patent.

Considering the substantial risk involved in "new product" R&D investment, and possibly much greater discounting of the future than assumed above, it may not seem that MAC could have a major effect on the economic incentives to invest.[1] On the other hand, the pharmaceutical industry has historically financed R&D from current earnings and, as a practical matter, may have limited incentive to seek external funding for this purpose. For one thing, the stockholders' risk would be substantially increased by borrowing money for such purposes. For another, an increase in stockholder investment must be paid for from after-tax dollars whereas R&D is now being paid for from before-tax dollars--i.e., the R&D becomes about twice as expensive from an investment perspective.

Taking the above example, the average reduction in current earnings would be about 6 percent--or 12 percent if the return were constant over the 20-year interval. Furthermore, if the industry were to maintain former "profit" levels, and we assume that profit accounts for about one-half of net earnings, the residual left over for R&D would be reduced by twice as much--12 percent and 24 percent, respectively.

We have sought above to merely illustrate several conceptual possibilities. Unfortunately, the empirical literature is not very helpful in discriminating the factors that influence industry R&D investment, except in the very long-run. In any event we hypothesize that:

> MAC reimbursement policy will lead to a reduction in R&D expenditure for new drug development.

Unless the effect is a "large" one, it is doubtful that this hypothesis can be tested directly. First of all, we are not likely to have information sufficient to distinguish between R&D expenditures for "new product development" and "old product modification", assuming that it can be done at all. Secondly, and more importantly, we probably could not discriminate a "small" effect due to the several exogenous "shocks" affecting R&D incentives in recent times: (1) the 1962 FDA drug amendments; (2) an alleged temporary depletion of R&D possibilities; and (3) a large increase in federal R&D drug expenditure. The latter bid up the industry salary scale and therefore the cost of R&D. Although it may be worthwhile to give some brief attention to testing this hypothesis directly, we believe that it would be more usefully tested in the context of a much-needed and more comprehensive study of R&D in the pharmaceutical industry. As it is now, even if an unambiguous negative effect of MAC on industry R&D were found, we would not know how to value that effect. In order to do so, one must have some sense of what the optimal R&D level is. One cannot merely assume that the patent law, having remained unchanged for so long, furnishes an appropriate incentive for R&D in every industry or even on the average. The incentive may be too much in some industries and too little in others. It is important to reach some consensus on what the situation is in the pharmaceutical industry.

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[1] Of course, if the average commercial life is shorter than the effective patent period there would be almost no effect on investment incentives whatsoever.

6.3 Hypotheses Concerning the Impact of MAC on the Retail Pharmacy

As noted in Section 3.4, the way in which "widely and consistently available" has been defined is an important intervening variable affecting evaluation of the MAC program. Although MAC products may be widely and consistently available from "any formulator or labeler" as required by law, they may or may not be available in all or most participating pharmacies, depending upon whether or not total demand for generic products justifies the expense of stocking them and depending upon whether or not a pharmacist accepts FDA assurances of bioequivalence and manufacturing quality control. We indicate the following hypotheses:

> Pharmacy inventory costs may be increased if MAC products were not formerly stocked by most pharmacies.
>
> Participating pharmacies may not stock all the MAC products--i.e., some MAC products may not in fact be widely available.
>
> Pharmacists may informally require "brand necessary" certification for MAC'd products that are not stocked.
>
> Pharmacists may dispense higher-priced brand name products for MAC products that are not stocked.
>
> The rate of pharmacy participation in the Medicaid program may be reduced if MAC products are not widely available.

As a corrollary we also have that:

> The savings in reimbursement cost will be reduced for MAC'd products that are not widely available.

The last four hypotheses will be tested in varying degrees.

Because of wide variability in market prices for the same manufacturer's product and a presumed lack of competition, especially in the absence of widespread price advertising, state Medicaid programs have traditionally sought to reimburse prescriptions at cost. They have taken a "value-added" approach in doing so, setting reimbursement equal to the ingredient cost plus the estimated cost of actually dispensing the product--the dispensing fee. In many states the ingredient cost has been taken as the Average Wholesale Price (AWP) listed in either the Red or Blue Book. However, because of various kinds of purchasing discounts the actual prices paid by pharmacies have been estimated to be 15-18 percent less than the wholesale prices.[1] The EAC component of the MAC program requires that all states use actual price data in setting ingredient cost reimbursement levels. Thus, we have the hypothesis that:

> Reimbursement of ingredient costs will be decreased due to EAC.

However, the pharmacy organizations maintain that reimbursement of ingredient cost was necessarily excessive in order to compensate for dispensing fee levels that were too low. In response to this concern the MAC regulations required the states to conduct cost studies and establish reasonable cost-related fees. If the pharmacy groups are correct, it can be hypothesized that:

> The savings in reimbursement of ingredient cost will be offset in part by an increase in reimbursement of dispensing fees.

Nevertheless, the underlying assumption of the EAC reimbursement initiative must be that:

> Total drug reimbursement--ingredient cost and dispensing fee combined--will be decreased due to EAC and the reimbursement savings will be in excess of the added administrative and other program costs.

The last three hypotheses are the principal EAC hypotheses to be tested in the present study. However, other hypotheses are also important.

While regulations encourage states to set variable dispensing fee levels that take account of relevant pharmacy cost differences (e.g., chain vs. independent, urban vs. rural), almost all states set a single (fixed) dispensing fee for all pharmacies. Even if this fee fairly reflects average dispensing costs, it will be too high for some pharmacies and too low for others. Thus, any reduction in aggregate reimbursement levels, such as that implied by EAC, results in a greater number of pharmacies having average costs in excess of the reimbursement levels. Consider the following expression for pharmacy profit (π) in discussing the implications:

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[1] Norwood, Lipson and Freeman (1977) found in a recent study of Iowa pharmacies that the mean differential between average wholesale price and actual acquisition cost was $0.56 per prescription, equal to 17.5 percent of the actual acquisition cost.

$$\pi = P_G \cdot X_G + P_P \cdot X_P - VC(X_G + X_P) - FC,$$

where X_G is the number of government-reimbursed prescriptions,

X_P is the number of non-public or private prescriptions,

P_G is the average reimbursement level for government prescriptions,

P_P is the average price paid by private patients,

VC is the variable cost per prescription (e.g., labor plus ingredient cost), and

FC is the fixed cost (e.g., overhead).

A pharmacy will accept government reimbursement (P_G) as long as it exceeds the variable cost (VC). However, this implies that the price charged to private patients (P_P) exceeds the average cost (AC), as shown below:

$$P_P \geq AC + (X_G/X_G + X_P)\ (P_P - P_G)$$

That is, some portion of the costs fairly allocable to public-paid prescriptions may in fact be shifted to private consumers. Since private demand may be thought to be more price inelastic than the public sector's demand, optimal pricing implies such a greater allocation of fixed costs to private patients. Thus, we hypothesize that:

EAC reimbursement may lead to an increase in prescription prices for private patients.

The presumption seems to have been that any EAC cost savings would come from pharmacy profit. If it does not, it is not a "true" social benefit and the cost savings attributed to the program must be reduced accordingly. However, we will not have the requisite data for testing this hypothesis. The IMS National Prescription Audit (NPA) could be used for this purpose.

If public reimbursement falls below the variable cost level, a pharmacy will discontinue participation in the Medicaid program. Thus, there is reasonable basis to hypothesize that:

> EAC reimbursement will lead to a reduction in pharmacy participation.

This hypothesis will be tested; however, we have serious concerns about the reliability of our pharmacy participation rate data. The hypothesis could be tested more reliably from NPA data.

Pharmacies may also respond to reduced reimbursement levels by eliminating unpriced services such as free delivery, patient monitoring and consultation. Whereas this reduces operating costs, it also reduces the social benefits.

> EAC reimbursement may cause unpriced (free) services to be eliminated.

This hypothesis cannot be tested in the present study.

If the financial viability of some pharmacies is threatened or the lower reimbursement levels are perceived to be inequitable, EAC reimbursement may be a stimulus to fraudulent practices--e.g., overbilling and prescription splitting. Of course, it would be difficult to monitor such outcomes directly. However, an increase in the incidence of prescription splitting could perhaps be inferred if it were found that EAC caused an increase in the number of prescriptions per Medicaid enrollee. Thus, we shall test the hypothesis that:

EAC reimbursement may cause an apparent increase in the utilization rate.

Finally, with respect to pharmacy behavior, recall a hypothesis suggested by Lilly's study of the California MAIC program--namely, that:

The MAC price level may tend to become the "floor" for reimbursement of ingredient cost.

The MAC price is supposed to be the upper-limit on reimbursement with actual reimbursement being the lower of acquisition cost and the MAC price.[1] However this provision is difficult for the states to enforce and, assuming it is not systematically enforced, pharmacists may tend to claim MAC-level reimbursement even if the reimbursement ingredient cost is less. It should be possible to test this hypothesis from the data being collected.

6.4 Hypotheses Concerning the Impact of MAC on Physicians

Except in the comparatively few states that still have anti-substitution legislation, it is not apparent that the MAC reimbursement component of the MAC program will have a direct impact on physician prescribing behavior. Although most physicians will no doubt be aware of the change in reimbursement policies, enactment of substitution legislation in most states means that the program can operate without the explicit "cooperation" of physicians. The physicians can still prescribe brand name products for Medicaid patients, but the pharmacist will substitute unless "brand necessary" is indicated. Of course, in those states with anti-substitution laws a pharmacist must, in principle, call the physician for approval of the substitution. Such "call backs"--if they occur--would be an annoyance to the physicians and give impetus to generic prescribing for public patients, and possibly also private patients. Thus, it can be hypothesized that:

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[1] Furthermore, the total reimbursement is supposed to be the lower of ingredient cost--as determined above--plus fee and the "usual and customary" price--i.e., the market price to private-pay customers.

> MAC reimbursement policies will lead to greater generic prescribing in states with anti-substitution legislation.

It should be possible to test this hypothesis from IMS data.

The MAC program assumes that:

> Physicians generally will not exercise the "over-ride" option.

This hypothesis will be tested.

The FDA bioequivalency testing program and dissemination of information on products judged to be therapeutically equivalent may allay physician concerns about the quality of generic equivalents and thereby effect an increase in generic prescribing. However, the FDA program, although important for the MAC program, should perhaps not be viewed as being an integral part of it. In any event it is doubtful that this effect could be separated from the effects of the soon-to-be-released drug price book that is an integral part of the MAC program.

The information on actual drug prices, as opposed to wholesale list prices, will soon be distributed in convenient format to all physicians and pharmacists. This information will permit ready comparison of drug prices for all products in each generic and therapeutic class. This is being done in expectation that pharmacists and especially physicians are not sufficiently aware of the "large" differences in price for generically-equivalent products and that being "sensitized" to them, they will be more cost conscious in prescribing and dispensing. However, the dissemination of such information entails no change in pecuniary incentive to anyone. Its presumed beneficial effect depends entirely upon a "public-spirited" concern for containing the cost of health care. In any event the underlying hypotheses is that:

> "Better" information on the actual distribution of drug prices will lead to a reduction in prescription cost.

6.5 Hypotheses Concerning the Impact of MAC on Consumers

If one assumes that MAC reimbursement policies lead to increased "availability" and stocking of the lower-price generic equivalents, this may imply a significant "spill-over" or "external" benefit to non-public consumers. Whereas a pharmacist had formerly been dispensing a higher-price brand name product on generic prescription, he might now dispense the lower-price generic product instead. In addition, the possibility of a substitution could be indicated with respect to brand name prescriptions. It is therefore hypothesized that:

> MAC reimbursement policies will lead to prescription cost savings for private patients.

This hypotheses is not being tested. The IMS data could be used for this purpose, but findings might well not be conclusive due to the many other pressures for generic dispensing.

Other hypotheses are either straightforward or have already been discussed.

> Private third-party prescription drug programs may eventually follow the government's lead and institute MAC programs.
>
> In the short run, the MAC program may cause prescription prices to private patients to increase as pharmacies shift the burden of lower EAC ingredient costs reimbursements from Medicaid onto their private paying customers.
>
> The long run impact of the MAC program may be an overall reduction in prescription prices for the following reasons:

- Increased price competition on multiple-source products may spillover into the non-government market.
- Increased generic prescribing by physicians may benefit the private consumers.

The hypotheses with respect to MAC impacts have been developed above in somewhat informal fashion. It was felt that a more formal theoretic model was not appropriate, that none could claim general acceptance in representing oligopolistic-type markets and that none could adequately abstract all the relevant behavioral dimensions of the MAC program. Furthermore, we have sought to give an understanding of the behavioral environment that can be understood by economists and non-economists alike and that conforms reasonably well to perceptions of what's happening in the "real world."

7.0 SURVEY OF MEDICAID DRUG PROGRAMS

As part of this MAC/EAC evaluation study, the Survey of Medicaid Drug Programs was conducted in order to develop a five-year profile of state program characteristics and data availability. This was done for two reasons: (1) These data were needed to identify those states maintaining requisite data for the sample state analyses (see Section 8.0) and to otherwise ascertain relevant program criteria for use in selection of the sample states. (2) In addition, the data will be used in the cross-sectional/time-series and selected tabular analysis of drug program experience (see Section 9.0). No doubt the survey will be found useful for other purposes as well. It gives a heretofore unavailable comparison of state drug program characteristics, both cross-sectionally and through time.

Most of the drug program information reported herein was obtained via telephone survey of the state drug program managers, also known as pharmacist consultants. Whereas this telephone survey has elicited much useful profile information on state drug program parameters, we nevertheless believe it important to begin by underlining certain limitations: (1) The telephone survey data are unverified. (2) The state drug programs exhibit great diversity and complexity. A closed-end survey instrument is not sufficiently versatile to give a fully comprehensive description of state program differences. (3) Some of the information sought (e.g., the pharmacy participation rate and the administration costs) was not readily available in most states. However, most respondents indicated that such information could be developed, albeit with varying degrees of difficulty. None of these problems could have been resolved within the resource limitations of this study. We believe that it would require on-site data collection in each state to develop a more accurate and comprehensive descriptive profile of the state Medicaid drug programs.

7.1 Survey Administration

The kinds of information sought as part of the Survey can be grouped into six broad catgories:[1]

- Reimbursement Methods
- Program Restrictions
- Program Administration
- Pharmacy Participation
- Substitution
- Data Availability[2]

All data were to be obtained for a five-year time interval, 1974-1978.

OMB clearance was required for the survey. However, prior to receiving clearance, the survey instrument was pilot-tested in five states:

- Arkansas
- California
- Massachusetts
- Tennessee
- Texas

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[1] The actual survey instrument is shown in Appendix A.

[2] These results are not reported here.

se states represent a fair cross-section of Medicaid drug programs in terms of program size, geographic location and variety of program policies.

Upon receipt of OMB clearance (No. 66-S-79004), a letter was sent to each state Medicaid pharmacy consultant requesting cooperation and briefly describing the survey, the time required to complete the survey and the overall objectives of the project. They were given the option of preforming the interview by telephone or having the instrument mailed to them. Six states exercised the second option. The reminder of the states were contacted by telephone.

The telephone interviews were primarily conducted in May 1979 and went quite smoothly. Only one state, Ohio, refused to participate in the survey. Nevertheless, the survey will be attempted once more in that state. In addition, two states -- Alaska and Hawaii -- were inadvertently omitted from the survey.[1] The survey will be completed in these states and the results updated.

The completed survey instrument was returned to the interviewee for confirmation and any additional information not available at the time of the interview This effort to further validate the information did not have much success. Thus, the results presented herein rely primarily on the original telephone interviews.

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[1] A survey was also not attempted in Arizona and Wyoming. Arizona does not have a Medicaid program and Wyoming program does not include drug benefits.

7.2 Survey Results

This section reports the survey results and briefly discusses the findings.[1] Nevertheless, we have not yet undertaken analyses of the survey data. This will be done in Phase II of the project.

Reimbursement Techniques. Table 7-1 summarizes the criteria used by each state to set ingredient cost reimbursement levels in each year, 1974-1978. Most states used a combination of criteria. The headings are defined as follows:

- AWP - Average Wholesale Price as reported by national price compilations, the Red Book or Blue Book.
- AWP Less Discount - The Average Wholesale Price less a set percentage discount for a drug product.
- Wholesaler Supplied - Lists of drug prices obtained from wholesalers who do business in the state.
- Selected Products: Direct - The direct price is what the manufacturer has established as the price when shipped directly from the manufacturer. Such information may be derived from manufacturer price lists or from the Red or Blue Book.
- Selected Products: Quantity - The price of a drug at a specified quantity (100s, 500s, 1,000s). Generally larger package sizes carry a lower price per unit. Such information is available from manufacturers, wholesalers, or the Red or Blue Book.
- Federal Decile - The price list distributed by the federal government based on IMS review of invoice prices. The percent is the decile level. For example, at a specified price, 70 percent of the invoice prices fell under or at that level.
- AAC - Actual Acquisition Cost is the actual invoice cost that a provider pays for a drug product. Generally, this is confirmed by audits.

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[1] Additional results (e.g., the effective dates on various program changes and the information on data availability) are also available from the completed survey instruments, provided to HCFA as a Technical Appendix for this report. All such information will also be included on a computer tape to be produced during Phase II of the project. The survey results are also summarized by state in Appendix B.

Table 7-1

INGREDIENT COST REIMBURSEMENT - 1978

				SELECTED PRODUCTS		FEDERAL DECILE					
	AWP	AWP LESS DISCOUNT	WHOLESALER SUPPLIED	DIRECT	QUANTITY	YES	NO	PERCENT	AAC	USUAL AND CUSTOMARY	OTHER
Alabama			X	X			X			X	
Alaska											
Arizona											
Arkansas	X						X			X	State MAC
California	X			X	X		X			X	State MAC
Colorado	X		X	X	X		X				State MAC
Connecticut	X			X			X			X	
Delaware							X		X	X	
D.C.			X	X	X		X			X	
Florida			X				X			X	
Georgia	X		X		X		X			X	
Hawaii											
Idaho	X		X				X			X	
Illinois			X		X	X		50%	X	x	State MAC
Indiana	X					X		70%		X	
Iowa			X	X	X		X			X	
Kansas	X		X	X	X		X			X	Prices fr.Pha
Kentucky	X		X	X	X		X			X	State MAC
Louisiana	X		X				X			X	
Maine	X		X				X			X	
Maryland	X			X	X	X		70%			Lower EAC
Massachusetts		X	X	X	X		X			X	
Michigan	X	X	X				X		X		State MAC
Minnesota			X				X			X	
Mississippi	X			X	X	X		70%		X	State MAC
Missouri	X		X	X	X	X		>70%		X	State MAC
Montana	X			X			X			X	
Nebraska			X		X		X			X	
Nevada		X			X		X			X	
New Hampshire			X				X			X	
New Jersey	X	X	X				X			X	
New Mexico			x	X	X		X			X	
New York			X	X	X	X		70%			
North Carolina	X	X				X	x	75%		X	
North Dakota			X				X			X	
Ohio							X				
Oklahoma	X	X	X				X			X	
Oregon	X		X	X	X	X		70%			State MAC
Pennsylvania	X			X			X			X	
Rhode Island	X			X			X			X	
South Carolina	X	X	X			X		70%		X	
South Dakota	X		X				X			X	
Tennesse							X		X	X	State MAC
Texas	X			X			X		X	X	
Utah			X	X	X		X			X	State MAC
Vermont	X			X			X			X	
Virginia			X	X	X		X			X	
Washington			X				X		X		State MAC
West Virginia	X						X				
Wisconsin	X		X	X	X		X			X	State MAC
Wyoming											

TABLE 7-1
(continued)

INGREDIENT COST REIMBURSEMENT

Year: 1977

				SELECTED PRODUCTS		FEDERAL DECILE					
	AWP	AWP LESS DISCOUNT	WHOLESALER SUPPLIED	DIRECT	QUANTITY	YES	NO	PERCENT	AAC	USUAL AND CUSTOMARY	OTHER
Alabama			X	X			X			X	
Alaska											
Arizona											
Arkansas	X						X			X	State MAC
California	X			X	X		X			X	State MAC
Colorado	X		X				X				State MAC
Connecticut	X			X			X			X	
Delaware							X		X	X	
D.C.			X		X		X			X	
Florida			X		X		X			X	State MAC
Georgia	X		X		X		X			X	
Hawaii											
Idaho	X		X				X			X	
Illinois			X		X	X		50%	X	X	State MAC
Indiana						X		70%		X	
Iowa			X	X	X		X			X	
Kansas	X		X	X	X		X			X	Price fr.Pharm.
Kentucky	X		X	X	X		X			X	State MAC
Louisiana	X		X				X			X	
Maine	X		X				X				
Maryland	X			X	X	X		70%			Lower EAC
Massachusetts	X						X			X	
Michigan	X	X	X				X		X		
Minnesota			X							X	
Mississippi	X			X	X	X		70%		X	State MAC
Missouri	X		X	X	X	X		>70%		X	State MAC
Montana	X			X			X			X	
Nebraska			X		X		X				
Nevada		X			X		X			X	
New Hampshire			X				X			X	
New Jersey	X	X	X				X			X	
New Mexico			X	X	X		X			X	
New York			X	X	X	X		>70%			
North Carolina	X	X				X		75%		X	
North Dakota			X				X			X	
Ohio							X				
Oklahoma	X	X	X				X			X	
Oregon	X		X	X	X	X		70%			State MAC
Pennsylvania	X			X			X			X	
Rhode Island	X			X			X			X	
South Carolina	X	X	X			X		70%			
South Dakota	X		X				X			X	
Tennesse							X		X	X	State MAC
Texas	X			X			X		X	X	
Utah			X	X	X		X			X	State MAC
Vermont	X			X			X			X	
Virginia			X	X	X		X				
Washington			X	X			X		X		State MAC
West Virginia	X						X				
Wisconsin	X		X	X	X		X			X	State MAC
Wyoming											

TABLE 7-1
(continued)

INGREDIENT COST REIMBURSEMENT

Year: 1976

				SELECTED PRODUCTS		FEDERAL DECILE					
	AWP	AWP LESS DISCOUNT	WHOLESALER SUPPLIED	DIRECT	QUANTITY	YES	NO	PERCENT	AAC	USUAL AND CUSTOMARY	OTHER
Alabama			X				X		X		
Alaska											
Arizona											
Arkansas	X						X			X	State MAC
California	X						X			X	State MAC
Colorado	X		X				X				State MAC
Connecticut	X			X			X			X	
Delaware							X		X	X	
D.C.			X		X		X			X	
Florida	X		X				X			X	
Georgia	X		X		X		X			X	
Hawaii											
Idaho							X				Pd. as billed
Illinois	X		X		X	X		50%		X	State MAC
Indiana	X		X			X		>70%		X	
Iowa			X	X	X		X			X	
Kansas	X		X	X	X		X			X	Prices fr.Pharm
Kentucky	X		X	X	X		X			X	State MAC
Louisiana	X		X				X			X	
Maine	X		X				X				
Maryland	X			X	X	X		70%			Lower EAC
Massachusetts	X						X			X	
Michigan	X	X	X				X		X		
Minnesota			X				X			X	
Mississippi	X			X	X	X		70%		X	State MAC
Missouri	X		X	X	X	X		>70%		X	State MAC
Montana	X			X			X			X	
Nebraska			X				X			X	
Nevada		X			X		X			X	
New Hampshire	X		X				X			X	
New Jersey	X	X	X				X			X	
New Mexico	X		X	X	X		X			X	
New York	X		X	X	X	X		>70%			
North Carolina	X	X					X			X	
North Dakota	X		X				X				
Ohio							X				
Oklahoma	X	X	X				X			X	
Oregon	X		X	X	X	X		70%			State MAC
Pennsylvania	X			X			X			X	
Rhode Island	X			X			X			X	
South Carolina	X	X	X			X		70%			
South Dakota	X		X				X			X	
Tennesse							X		X	X	State MAC
Texas	X			X			X		X	X	
Utah			X				X			X	State MAC
Vermont	X				X		X			X	
Virginia			X	X	X		X				
Washington			X	X			X		X		State MAC
West Virginia	X						X				
Wisconsin	X		X	X	X		X			X	State MAC
Wyoming											

TABLE 7-1
(continued)

INGREDIENT COST REIMBURSEMENT Year: 1975

				SELECTED PRODUCTS		FEDERAL DECILE					
	AWP	AWP LESS DISCOUNT	WHOLESALER SUPPLIED	DIRECT	QUANTITY	YES	NO	PERCENT	AAC	USUAL AND CUSTOMARY	OTHER
Alabama			X				X		X		
Alaska											
Arizona											
Arkansas	X						X			X	
California	X						X			X	State MAC
Colorado	X		X				X				State MAC
Connecticut	X						X			X	
Delaware							X		X	X	
D.C.			X				X				
Florida	X		X				X			X	
Georgia	X		X		X		X			X	
Hawaii											
Idaho							X				pd. as billed
Illinois	X		X		X		X			X	State MAC
Indiana	X		X				X			X	
Iowa			X	X	X		X			X	
Kansas	X		X	X	X		X			X	Prices fr. Phar
Kentucky	X		X	X	X		X			X	State MAC
Louisiana	X		X				X			X	
Maine	X		X				X				
Maryland	X			X	X		X				
Massachusetts	X						X			X	
Michigan	X	X	X				X		X		
Minnesota			X				X			X	
Mississippi	X			X	X		X			X	State MAC
Missouri	X		X	X	X		X			X	State MAC
Montana							X			X	
Nebraska			X				X				
Nevada	X		X		X		X				
New Hampshire	X						X				
New Jersey	X	X	X				X			X	
New Mexico	X		X				X				
New York	X						X				
North Carolina	X	X					X			X	
North Dakota			X				X				
Ohio							X				
Oklahoma	X	X	X				X			X	
Oregon	X		X	X	X						State MAC
Pennsylvania	X			X			X			X	
Rhode Island	X			X			X			X	
South Carolina	X		X				X				
South Dakota	X		X				X			X	
Tennesse							X		X	X	State MAC
Texas	X						X		X	X	
Utah			X				X			X	
Vermont	X				X		X				
Virginia			X	X	X		X				
Washington			X	X			X		X		State MAC
West Virginia	X						X				
Wisconsin	X		X	X	X		X			X	State MAC
Wyoming											

TABLE 7-1
(continued)

INGREDIENT COST REIMBURSEMENT

Year: 1974

				SELECTED PRODUCTS		FEDERAL DECILE					
	AWP	AWP LESS DISCOUNT	WHOLESALER SUPPLIED	DIRECT	QUANTITY	YES	NO	PERCENT	AAC	USUAL AND CUSTOMARY	OTHER
Alabama			X				X		X		
Alaska											
Arizona											
Arkansas	X						X			X	
California	X						X			X	State MAC
Colorado	X						X				State MAC
Connecticut	X						X			X	
Delaware							X		X	X	
D.C.			X				X				
Florida	X		X				X			X	
Georgia			X				X			X	
Hawaii											
Idaho							X				pd. as billed
Illinois	X		X		X		X		X	X	State MAC
Indiana	X		X				X			X	
Iowa			X	X	X		X			X	
Kansas	X		X	X	X		X			X	Prices fr. Phar
Kentucky	X		X	X	X		X			X	State MAC
Louisiana	X		X				X			X	
Maine	X		X				X				
Maryland	X			X	X		X				
Massachusetts	X						X			X	
Michigan	X	X	X				X		X		
Minnesota			X							X	
Mississippi	X			X	X		X			X	State MAC
Missouri	X		X	X	X		X			X	State MAC
Montana							X			X	
Nebraska			X				X				
Nevada	X		X		X		X				
New Hampshire	X						X				
New Jersey	X	X	X				X			X	
New Mexico	X		X				X				
New York	X						X				
North Carolina	X	X					X			X	
North Dakota			X				X				
Ohio							X				
Oklahoma											
Oregon	X		X	X	X		X				State MAC
Pennsylvania			X	X			X			X	
Rhode Island	X			X			X			X	
South Carolina	X		X				X				
South Dakota							X				
Tennesse							X		X	X	State MAC
Texas	X						X		X	X	
Utah			X				X			X	
Vermont	X				X		X				
Virginia			X	X	X		X				
Washington			X	X			X		X		State MAC
West Virginia	X										
Wisconsin	X		X	X	X		x			X	State MAC
Wyoming											

- Usual and Customary - This is the level at which a provider charges the general public for a drug product. The usual and customary charge is compared to the ingredient cost plus fee level; the lower is the actual reimbursement to the provider.
- Other - This category includes additional methods of setting ingredient cost reimbursement, mainly a state maximum allowable cost program.

In 1978 a total of 28 states used the average wholesale price (AWP) from the Red book or Blue Book; only seven states used AWP less a discount and five of these seven also used the undiscounted AWP.[1] Some 30 of the 47 reporting states (64 percent) said they use wholesaler-supplied prices. For selected drug products, 23 states use manufacturers' direct prices and 20 states use prices based on larger (e.g. 500s, 1000s) package sizes to set reimbursement levels. Only nine states said that they use the federal invoice level decile data to establish ingredient cost, usually at the 70th percentile level or higher. Some 39 out of 47 surveyed states also indicate usual and customary ceiling. Six states pay actual acquisition cost (AAC), i.e., the provider bills the acquisition cost subject to audit review. Fifteen states in 1978 had their own maximum allowable cost programs. This and other information from the survey is summarized by year, 1974-1978, in Table 7-2.

The other portion of prescription reimbursement is the professional fee--see Table 7-3. In 1978 the fees ranged from $2.00 per prescription in Maine to $3.06 in California. Eight states had variable fees, with levels ranging from $1.30 to $3.25 in Kansas and from $2.25 to $3.30 in Idaho. These represent the highest and the lowest fees paid by state Medicaid programs.

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[1] The District of Columbia was also included in the survey, and for the sake of convenience, it will be counted among the states.

TABLE 7-2

Summary Data on State Medicaid Drug Programs

Numbers of States (except as noted)

	1974	1975	1976	1977	1978
Ingredient Cost					
AWP	29	33	34	28	28
AWP Less Discount	3	4	6	6	7
Wholesaler Supplied	26	28	29	29	30
Direct Price	12	12	17	21	23
Quantity Price	12	13	16	19	20
Federal Decile	--	—	8	9	9
Other		9	10	9	9
Usual and Customary	25	27	32	36	39
State MAC	11	13	14	15	15
Fees*					
Average Fee	$1.92	$2.07	$2.14	$2.37	$2.51
Distribution of Fee Levels					
Less than $2.00	17	10	8	2	0
$2.00-$2.50	14	23	25	31	19
$2.51-$3.00	0	1	2	4	19
Over $3.00	0	0	0	1	1
No. of Fee Changes	--	22	10	25	28
Average amount of change	--	$0.25	$0.29	$0.31	$0.36
Program Restrictions					
Formulary					
Open	13	13	13	14	15
Closed	7	8	8	9	9
Limits on No. of Rxs	4	5	6	6	6
Dollar Limits	4	4	4	4	4
Size Limit	25	26	27	28	28
Prior Authorization	26	28	29	29	30
Co-payment	3	7	12	17	14

*Fixed fee states only.

TABLE 7-3

STATE MEDICAID DRUG PROGRAM DISPENSING FEES: 1974 - 1978

	1974				1975				1976				1977				1978			
	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup
Alabama		X	1.90			X	1.90			X	1.90			X	2.25			X	2.25	
Alaska*																				
Arizona*																				
Arkansas	X		2.00		X		2.00		X		2.00		X		2.70		X		2.87	
California	X		2.42		X		2.70		X		2.86		X		3.06		X		3.06	
Colorado	X		1.85		X		2.00		X		2.00		X		2.50		X		2.90	
Connecticut	X		2.00		X		2.20		X		2.20		X		2.20		X		2.52	
Delaware	X		2.00		X		2.00		X		2.00		X		2.00		X		2.50	
Dist. of Columbia	X		1.60		X		1.80		X		1.80		X		1.80		X		2.59	
Florida			Average .33 - .40%	X			Average .33 - .40%	X			Average .33 - .40%	X	X		2.40		X		2.75	
Georgia	X		2.00		X		2.00		X		2.00		X		2.19		X		2.35	
Hawaii*																				
Idaho														X	2.25 - 3.30			X	2.25 - 3.30	
Illinois			1.35 + .30%	X	X		2.05		X		2.35		X		2.35		X		2.75	
Indiana	X		1.85		X		1.85		X		2.25		X		2.25		X		3.25	
Iowa	X		2.15		X		2.15		X		2.15		X		2.55		X		2.55	
Kansas		X	1.19 - 2.25			X	1.24 - 2.25			X	1.24 - 2.35			X	1.30 - 2.65			X	1.30 - 5.25	

TABLE 7-3

STATE MEDICAID DRUG PROGRAM DISPENSING FEES: 1974 - 1978 (continued)

(continued)

	1974				1975				1976				1977				1978			
	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup
Kentucky	X		1.65		X		1.80		X		1.80		X		1.80		X		2.22	
Louisiana	X		1.80		X		2.10		X		2.10		X		2.35		X		2.80	
Maine	X		2.00		X		2.00		X		2.00		X		2.00		X		2.00	
Maryland	X		1.75		X		2.00		X		2.50		X		2.25		X		2.45	
Massachusetts	X		1.85		X		2.10		X		2.10		X		2.10		X		2.70	
Michigan	X		2.00		X		2.19 (max)		X		2.19 (max)		X		2.40		X		2.75	
Minnesota		X	1.20 to 5.00			X	1.20 - 5.00			X	1.20 - 5.00			X	1.20 - 5.00			X	1.20 - 5.00	
Mississippi	X		1.50		X		1.75		X		1.75		X		2.25		X		2.25	
Missouri	X		1.25		X		1.50		X		1.75		X		2.25		X		2.25	
Montana														X	2.00 - 3.25			X	2.00 - 3.25	
Nebraska		X	1.75 - 2.45			X	1.75 - 2.45			X	1.75 - 2.45			X	2.20 - 2.79			X	2.33 - 2.79	
Nevada	X		2.40		X		2.75		X		2.75		X		2.90		X		2.90	
New Hampshire	X		2.20		X		2.20		X		2.20		X		2.20		X		2.70	
New Jersey		X	2.05 - 2.15			X	1.80 - 1.90			X	1.80 - 1.90			X	2.05 - 2.15			X	2.20 - 2.50	
New Mexico	X		2.00		X		2.00		X		2.50		X		2.50		X		2.65	
New York	X		1.80		X		1.80, NYC 2.00		X		1.80, NYC 2.00		X		1.80, NYC 2.00		X		2.60	
North Carolina	X		2.00		X		2.50		X		2.50		X		2.50		X		2.50	

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TABLE 7-3
STATE MEDICAID DRUG PROGRAM DISPENSING FEES: 1974 - 1978 (continued)
(continued)

	1974				1975				1976				1977				1978			
	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup	Flat	Variable	Amount	% Markup
North Dakota													X		2.50		X		2.75	
Ohio	X		2.00		X		2.00		X		2.00		X		2.00		X		2.60	
Oklahoma					X		2.50		X		2.50		X		2.50		X		2.50	
Oregon			$.85 + 50%	X			$.85 + 50%	X	X		2.35		X		2.55		X		2.70	
Pennsylvania			50%	X	X		1.85		X		2.00		X		2.00		X		2.00	
Rhode Island	X		2.00		X		2.00		X		2.00		X		2.20		X		2.20	
South Carolina	X		1.90		X		1.90		X		1.90		X		2.40		X		2.40	
South Dakota					X		2.25		X		2.25		X		2.25		X		2.50	
Tennessee	X		1.95		X		2.10		X		2.10		X		2.10		X		2.30	
Texas		X	1.68 - 2.10			X	1.94 - 2.36			X	1.94 - 2.36			X	2.25 - 2.75			X	2.25 - 2.75	
Utah	X		1.90		X		2.20		X		2.20		X		2.40		X		2.40	
Vermont	X		1.85		X		1.85		X		1.85		X		2.00		X		2.00	
Virginia	X		1.95		X		1.95		X		1.95		X		2.25		X		2.70	
Washington	X		1.95	X*	X		2.15		X		2.23		X		2.35		X		2.19 - 2.60	
West Virginia				X			66% for $1.50-2.99; 50% for $3.00-7.99; 33% over $8.00 (1974 - 1977)										X		2.25	
Wisconsin						X	2.05 - 2.25			X	2.05 - 2.25		X		2.40		X		2.65	
Wyoming*																				

* 40% markup until 8/1/74

In 1974 fees had ranged from $1.60 in the District of Columbia to $2.42 in California. Between 1974 and 1978 all states except Maine, Minnesota, and Oklahoma raised their fees. These increases ranged from $0.15 in Pennsylvania to $1.00 in Louisiana and Missouri, and were $.87 in Arkansas and $.85 in Colorado. Over the five-year interval the fees have increased $0.50 to $0.75 in most states.

Program Restrictions - Table 7-4 summarizes the controls used by state Medicaid drug programs in each year, 1974-1978. The headings are defined as follows:

- Quantity Limits - Rx - This is a program policy that puts a maximum on the number of prescriptions a recipient may receive in a given month.
- Quantity Limits - $ - This is a program policy that puts a maximum on the dollar amount a recipient may incur in receiving drug products in a given month.
- Quantity Limits - Size - This is a program policy that limits the size of a prescription available to a recipient. Size restrictions can apply as a maximum or a minimum. For example, a drug product could be limited to a 10 day supply or in the case of drugs for a chronic condition, the minimum prescription size could be a 30 day supply.
- Formulary - A formulary is a formal list of drugs that will be reimbursed for by a state Mediciad drug program. This list can be "Open" where practically all available drugs are included or "Closed" where the state limits the drug products for which it will pay.
- Co-payments - Under revised statutes, a state Medicaid program may require the recipient to pay a portion of the prescription cost. The usual amount is $.50.
- Mini-MAC - This refers to states that have in addition to the federal MAC program, their own MAC program.

Drug program controls can be divided into two fundamental categories: (1) those that restrict the quantities of drug products dispensed and (2) those that limit the availability of drug products themselves. The former category includes such controls as limits on the number of prescriptions a recipient

TABLE 7-4

PROGRAM RESTRICTIONS - 1978

	QUANTITY LIMITS			PRODUCT RESTRICTIONS				CO-PAYMENTS			Mini-MAC
				Formulary		Prior Auth					
	Rxs	$	Size	Open	Closed	Yes	No	Yes	No	Amt	
Alabama				X		X		X		.50	
Alaska*											
Arizona*											
Arkansas	X		X				X	X		.50	X
California			X		X	X			X		X
Colorado			X	X		X			X		X
Connecticut		X	X			X			X		
Delaware							X		X		
D. C.			X	X		X		X		.50	
Florida		X	X	X		X		X		.50	
Georgia			X	X			X	X		.50	
Hawaii*											
Idaho		X	X	X			X		X		
Illinois			X	X		X			X		X
Indiana				X		X			X		
Iowa						X			X		
Kansas				X		X		X		.50	
Kentucky			X		X	X			X		X
Louisiana			X		X		X		X		
Maine			X			X	X		X		
Maryland			X			X		X		.50	
Massachusetts	X					X			X		
Michigan	X		X			X			X		X
Minnesota			X				X		X		
Mississippi			X		X				X		X
Missouri			X		X				X		X
Montana							X	X		.50(over 2 refil	
Nebraska			X			X			X		
Nevada	X					X		X		.50	
New Hampshire						X			X		
New Jersey			X		X	X			X		
New Mexico				X		X		X		.25	
New York							X	X		.50	
North Carolina							X	X		.50	
North Dakota				X			X		X		
Ohio											
Oklahoma	X						X		X		
Oregon			X		X	X			X		X
Pennsylvania				X		X			X		
Rhode Island			X			X			X		
South Carolina			X		X	X		X		.50	
South Dakota			X				X	X		.50	
Tennessee			X	X		X			X		X
Texas	X		X				X		X		
Utah						X			X		
Vermont				X		X			X		
Virginia							X	X		.50	
Washington		X	X			X			X		X
West Virginia			X			X			X		
Wisconsin			X		X	X			X		X
Wyoming *											

TABLE 7-4

PROGRAM RESTRICTIONS

(continued)

Year: 1977

	QUANTITY LIMITS			PRODUCT RESTRICTIONS				CO-PAYMENTS			Mini-MAC
				Formulary		Prior Auth					
	Rxs	$	Size	Open	Closed	Yes	No	Yes	No	Amt	
Alabama				X		X		X		.50	
Alaska*											
Arizona*											
Arkansas	X		X				X	X		.50	X
California			X		X	X			X		X
Colorado			X	X		X			X		X
Connecticut		X	X			X			X		
Delaware							X		X		
D. C.			X	X		X		X		.50	
Florida		X	X	X		X		X		.50	X
Georgia			X	X			X	X		.50	
Hawaii*											
Idaho		X	X	X			X		X		
Illinois			X	X		X			X		X
Indiana				X		X			X		
Iowa						X			X		
Kansas				X		X		X		.50	
Kentucky			X		X	X			X		X
Louisiana			X		X		X		X		
Maine			X			X			X		
Maryland			X			X		X		.50	
Massachusetts	X					X			X		
Michigan	X		X			X		X		.50	
Minnesota			X				X		X		
Mississippi			X		X		X	X		.50	X
Missouri			X		X		X		X		X
Montana							X	X		.50(over 2 refills	
Nebraska			X			X			X		
Nevada	X					X		X		.50	
New Hampshire						X			X		
New Jersey			X		X	X			X		
New Mexico				X		X		X		.25	
New York							X	X		.50(over 2 refills	
North Carolina							X	X		.50	
North Dakota				X			X		X		
Ohio											
Oklahoma	X						X		X		
Oregon			X		X	X			X		X
Pennsylvania				X		X			X		
Rhode Island			X			X			X		
South Carolina			X		X	X		X		.50	
South Dakota			X				X	X		.50	
Tennessee			X	X		X			X		X
Texas	X		X				X		X		
Utah						X					X
Vermont							X		X		
Virginia							X	X		.50	
Washington		X	X			X			X		X
West Virginia			X			X			X		
Wisconsin			X		X	X			X		X
Wyoming *											

TABLE 7-4

PROGRAM RESTRICTIONS

(continued)

Year: 1976

	QUANTITY LIMITS			PRODUCT RESTRICTIONS				CO-PAYMENTS			Mini-MAC
				Formulary		Prior Auth					
	Rxs	$	Size	Open	Closed	Yes	No	Yes	No	Amt	
Alabama				X		X		X		.50	
Alaska*											
Arizona*											
Arkansas	X		X				X	X		.50	X
California			X		X	X			X		X
Colorado			X	X		X			X		X
Connecticut		X	X			X			X		
Delaware							X		X		
D. C.			X	X		X			X		
Florida		X	X	X		X			X		
Georgia			X	X			X	X		.50	
Hawaii*											
Idaho		X	X	X			X		X		
Illinois			X	X		X			X		X
Indiana				X		X			X		
Iowa						X			X		
Kansas				X		X		X		.50	
Kentucky			X		X	X			X		X
Louisiana							X		X		
Maine			X				X		X		
Maryland			X			X		X		.50	
Massachusetts	X					X			X		
Michigan	X		X			X			X		
Minnesota			X				X		X		
Mississippi			X		X		X	X		.50	X
Missouri			X		X		X		X		X
Montana							X	X		.50	(over 2 refills
Nebraska			X			X			X		
Nevada	X					X		X		.50	
New Hampshire						X			X		
New Jersey			X		X	X		X		.25	
New Mexico				X		X			X		
New York							X		X		
North Carolina							X	X		.50	
North Dakota				X			X		X		
Ohio											
Oklahoma	X						X		X		
Oregon			X		X	X			X		X
Pennsylvania				X		X			X		
Rhode Island			X			X			X		
South Carolina			X		X	X			X		
South Dakota			X				X	X		.50	
Tennessee			X	X		X			X		X
Texas	X		X				X		X		
Utah						X			X		X
Vermont						X			X		
Virginia							X	X		.50	
Washington		X	X			X			X		X
West Virginia			X			X			X		
Wisconsin			X		X	X			X		X
Wyoming *											

TABLE 7-4

PROGRAM RESTRICTIONS
(continued)

Year: 1975

	QUANTITY LIMITS			PRODUCT RESTRICTIONS				CO-PAYMENTS			Mini-MAC
				Formulary		Prior Auth					
	Rxs	$	Size	Open	Closed	Yes	No	Yes	No	Amt	
Alabama				X		X		X	X	.50	
Alaska*											
Arizona*											
Arkansas							X	X		.50	
California	X		X		X	X			X		X
Colorado			X	X		X			X		X
Connecticut		X	X			X			X		
Delaware							X		X		
D. C.			X	X		X			X		
Florida		X	X	X		X			X		
Georgia			X	X			X	X		.50	
Hawaii*											
Idaho		X	X	X			X		X		
Illinois			X	X		X			X		X
Indiana				X		X			X		
Iowa						X			X		
Kansas				X		X			X		
Kentucky			X		X	X			X		X
Louisiana			X				X		X		
Maine			X				X		X		
Maryland			X			X			X		
Massachusetts	X					X			X		
Michigan	X		X			X			X		
Minnesota			X				X		X		
Mississippi			X		X		X		X		X
Missouri			X		X		X		X		X
Montana								X		.50	(over 2 refills
Nebraska			X			X			X		
Nevada						X			X		
New Hampshire						X			X		
New Jersey			X		X	X		X		.25	
New Mexico				X		X			X		
New York							X		X		
North Carolina							X	X		.50	
North Dakota				X			X		X		
Ohio											
Oklahoma	X						X		X		
Oregon			X		X	X			X		X
Pennsylvania				X		X			X		
Rhode Island			X			X			X		
South Carolina			X		X	X			X		
South Dakota			X				X		X		
Tennessee			X	X			X		X		X
Texas	X		X				X		X		
Utah						X			X		
Vermont						X			X		
Virginia							X	X		.50	
Washington		X	X			X			X		X
West Virginia						X			X		
Wisconsin			X		X	X			X		X
Wyoming*											

TABLE 7-4

PROGRAM RESTRICTIONS

(continued)

Year: 1974

	QUANTITY LIMITS			PRODUCT RESTRICTIONS				CO-PAYMENTS			Mini-MAC
				Formulary		Prior Auth					
	Rxs	$	Size	Open	Closed	Yes	No	Yes	No	Amt	
Alabama				X		X			X		
Alaska *											
Arizona*											
Arkansas							X	X		.50	
California	X		X		X	X			X		X
Colorado			X	X		X			X		X
Connecticut		X	X			X			X		
Delaware							X		X		
D. C.			X	X		X			X		
Florida		X	X	X		X			X		
Georgia			X	X			X		X		
Hawaii*											
Idaho		X	X	X			X		X		
Illinois			X	X		X			X		X
Indiana				X		X			X	X	
Iowa						X			X		
Kansas				X			X		X		
Kentucky			X		X		X		X		X
Louisiana			X				X		X		
Maine			X				X		X		
Maryland			X			X			X		
Massachusetts	X					X			X		
Michigan	X		X			X			X		
Minnesota			X				X		X		
Mississippi			X		X				X		X
Missouri			X		X				X		X
Montana							X	X		.50(over 2 refill	
Nebraska			X			X			X		
Nevada						X			X		
New Hampshire						X			X		
New Jersey			X			X			X		
New Mexico				X		X			X		
New York							X		X		
North Carolina							X	X		.50	
North Dakota				X			X		X		
Ohio											
Oklahoma	No Drug Program										
Oregon			X		X	X			X		X
Pennsylvania				X		X			X		
Rhode Island			X			X			X		
South Carolina			X		X	X			X		
South Dakota							X		X		
Tennessee			X	X			X		X		X
Texas	X		X				X		X		
Utah						X			X		
Vermont						X			X		
Virginia							X		X		
Washington		X	X			X			X		X
West Virginia						X			X		
Wisconsin			X		X	X			X		X
Wyoming*											

may receive in a given month, a limit on the dollar amount a recipient is allowed for drug products in a given month, and requirements concerning the size of the prescription. Size limits can be a function of the condition to be treated and can be either minimums or maximums. For example, states may limit prescriptions for antibiotics to a 10-day supply to treat an acute condition, or set a minimum 30-day supply for a drug used to treat a chronic condition. Another common size restriction in states is a 30-day maximum supply. The reason for this is that the eligibility period for Medicaid is just one month. Several states place limits on the number of prescriptions a recipient can obtain--e.g., Oklahoma, Arkansas, Nevada, and Texas. Massachusetts and Michigan do not have monthly limits but rather impose maximums on the number of refills.[1]

Four states have dollar limits wherein the recipient in excess is allowed only a set dollar amount for prescriptions. However, dollar limits are mitigated and closely related to prior authorization. A patient in Florida, for example, can exceed the dollar limit if approved by the state program. Connecticut is the exception. In that state the dollar limit applies to individual drug product costs. Prior approval must be obtained for a prescription costing more than the limit.

Prescription quantity limits have remained relatively stable over the five-year period. Two states added a limit on the number of prescriptions and no states added dollar limits. States with size limits increased by only three.

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[1] See Appendix B for such detailed information, by state.

Product restrictions entail that certain drugs are not available for Medicaid recipients. Essentially, a drug program has three alternatives in deciding what drugs it will pay for. It can choose to pay for all drugs; or pay for all drugs with specified exception; or it can strictly define what drugs are reimbursable. In the first two cases the program can use either no formulary on an "open" formulary, a listing of drugs not payable by the program. Those drugs for which the program will not pay can be listed in the formulary, or if there is no formulary, in a formal communication to both physician and pharmacy providers. The last case, where the program circumscribes what it will pay for, is a "closed" formulary. Because in some cases the drugs not normally paid for by the program are required for treatment, it is possible to get approval from the state to dispense and be reimbursed for an excluded drug. This involves prior authorization. As Table 7-4 shows, most states had open formularies in 1978. Almost all drugs were reimbursable. Nine states had closed formularies. However, those states with prior authorization indicate that they would not reimburse for some drugs such as anorexics, vitamins and Schedule II drugs.

Product restriction policies have not seen many changes since 1974. Only two states moved to close their formularies in five years. Prior authorization requirements have remained relatively stable, although it is not possible to identify changes in the number of drug products covered under this policy.

Another kind of program restriction is the requirement that recipients pay a small amount for each prescription they receive. These co-payments were originally tried as part of an experimental program in California during 1972-73. At that time the program required a waiver from HEW because such charges were prohibited under current statutes. However, the law was amended in 1974 permitting states to implement co-payments. In 1974 three states added co-payment and by 1978 the number had grown to 14 states. With one exception, New Mexico at $.25, the co-payment amount has been $.50.

The pattern of program restrictions bears little discernable relation to size, geographic location, or urbanization. In fact, there is no clear picture of state policy either tending to use a number of controls or no controls. The majority of states have one or two controls but not all. California, the second largest program in the country probably has more different controls than any other program, whereas New York, the largest program, has virtually no controls. Most of the other large programs in urban states have either no formulary or an open formulary and at best one other control. In those cases they generally have less strict controls related to size or prior authorization. Only Washington, Florida and two other states have dollar limitations. A limitation on the number of prescriptions is only found in one large state, Texas. Co-payments are most popular in the south. Out of fourteen states with co-payments, seven are in that region. Mini-MAC programs have spread throughout the coutry. Judging from the dispersion of controls, it would appear that no single factor outside the state's management philosophy and budgetary constraints affects the selection and implementation of controls. For example, California has long been an activist state. Prompted by the need to control costs it has tried and continues to try various program controls.

Substitution. The ability of the pharmacist to substitute a lower cost drug for a more expensive brand name product is an important aspect of the MAC program. Because MAC will only reimburse at the lower cost level the pharmacist when he receives a brand name prescription will either have to substitute with a less expensive drug product or lose money by dispensing the brand name. This situation is obviated if the physician writes the prescription generically.

The implementation of the MAC program occurred while many states still had anti-substitution laws. The MAC regulations override state anti-substitution laws for Medicaid patients and the pharmacist could substitute where necessary. Nevertheless, such override provisions might understandably have been somewhat confusing. Table 7-5 shows the status of substitution laws as of December 1978 and when the laws became effective in the states. In 1977, at the time of initial MAC implementation, 18 states still had anti-substitution laws. However, eight of these states enacted substitution laws in 1978.

Table 7-5

Substitution Laws and MAC
(as of 1978)

State	Substitution Law			Formulary		When Allowed	
	Yes	No	Year Enacted	Pos.	Neg.	MD ind.[1]	Unless MD ind.[2]
Alabama		X					
Alaska	X		1976			X	
Arizona	X		1978	X		X	
Arkansas	X		1975		X		X
California	X		1975		X		X
Colorado	X		1976				X
Connecticut	X		1976				X
Delaware	X		1976		X	X	
D.C.	X		1976	X			X
Florida	X		1976		X		X
Georgia	X		1977			X	
Hawaii		X					
Idaho	X		1978			X	
Illinois	X		1977	X		X	
Indiana		X					
Iowa	X		1976		X		X
Kansas	X		1978			X	
Kentucky	X		1976	X			X
Louisiana		X					
Maine	X		1975				X
Maryland	X		1977		X		X
Massachusetts	X		1976	X		X	
Michigan	X		1976				X
Minnesota	X		1974				X
Mississippi		X					
Missouri	X		1978		X	X	
Montana	X		1977				X
Nebraska	X		1977		X		X
Nevada		X					
New Hampshire	X		1973	X		X	
New Jersey	X		1977	X			X
New Mexico	X		1976	X			X
New York	X		1977	X		X	
North Carolina	X		1977				
North Dakota		X					

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[1] "MD indicates" means that physician must approve substitution usually by signing on the appropriate line of Rx.

[2] "Unless MD indicates" means that pharmacist may substitute unless physician indicates otherwise.

Table 7-5
(Continued)

Substitution Laws and MAC
(as of 1978)

State	Substitution Law			Formulary		When Allowed	
	Yes	No	Year Enacted	Pos.	Neg.	MD ind.[1]	Unless MD ind.[2]
Ohio	X		1977				X
Oklahoma		X					
Oregon	X		1975				X
Pennsylvania	X		1976	X		X	
Rhode Island	X		1976	X		X	
South Carolina	X		1978			X	
South Dakota	X		1978			X	
Tennessee	X		1977	X		X	
Texas		X					
Utah	X		1977		X		X
Vermont	X		1978	X			X
Virginia	X		1977	X		X	
Washington	X		1977		X	X	
West Virginia	X		1978		X	X	
Wisconsin	X		1976	X			X
Wyoming		X					

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[1] "MD indicates" means that physician must approve substitution usually by signing on the appropriate line of Rx.

[2] "Unless MD indicates" means that pharmacist may substitute unless physician indicates otherwise.

Administration of Medicaid Drug Programs. Among the issues raised concerning the MAC/EAC regulations was whether it caused an increase in the administrative costs associated with a state's drug benefit program. While the survey could not directly answer this question, it did attempt to obtain information on the administrative structure and costs of state drug programs. The resulting information is presented in Table 7-6.

The survey found that approximately half the states ran their own drug programs including claims processing, while the other half contracted out the claims processing to fiscal agents. It should be noted that states with fiscal agents still maintain complete policy control; the states always define program restrictions and reimbursement techniques.

The survey was less successful in identifying the costs associated with drug programs. In some cases pharmacist consultants could give the amount of the contract with the fiscal agent or the cost per claim processed. These findings for fiscal year 1978 are also included in Table 7-6. The actual administrative budgets for the drug program could not generally be identified, except in Texas and Maryland. Most other states said that with some research and analysis they could produce an estimate of administrative costs and any additional expenses associated with the MAC/EAC regulations. Such efforts were not, however, within the scope of the survey.

Pharmacy Participation Rates. An important issue associated with MAC is whether it affects the participation of pharmacies in state Medicaid programs. Some observers have suggested that participation would fall due to more stringent reimbursement limitations under the MAC/EAC regulations. As part of the survey, pharmacist consultants were asked about the level of

TABLE 7-6

Administration of Medicaid Drug Programs

State	Who Administers?			Administrative Costs
	State	Fiscal Agent	Comments	
Alabama		77-78 Blue Cross	EDSF 74-76	
Alaska*				
Arizona*				78: $77,067 per month
Arkansas		Blue Cross (BC)	Paid 74-76	
California		Blue Shield (BS)	Through 1978	
Colorado	x			78: 30-35¢ per claim
Connecticut		Pilgrim		
Delaware		TCC (The Computer Co.)	Blue Cross 74-77	
D.C.	x		No Anti-Substitution law	
Florida		SDC	Paid 74-76, EDSF 77	
Georgia	x			
Hawaii*				
Idaho		EDSF		
Illinois	x			78: 20-25¢ per claim
Indiana		BC/BS		
Iowa		BC/BS		$1 million a year
Kansas		EDSF	BC/BS before	
Kentucky	x			
Louisiana*				
Maine		Health Sys. Maint.		78: 44¢ per claim
Maryland	x			78: 2.2% of tot drg prgm costs
Massachusetts		Pilgrim		78: 30¢ per claim
Michigan	x			78: 40¢ per claim
Minnesota*				
Mississippi		BC/BS		78: 51¢ per claim
Missouri	x			
Montana		Dikewood		78: fiscal agent, $600,000/yr
Nebraska	x			
Nevada		BS	St. does data processing	
New Hampshire	x			
New Jersey		BC		78: 33¢ per claim
New Mexico		EDSF		
New York		Bradford	Since 1977	
North Carolina				

TABLE 7-6

Administration of Medicaid Drug Programs (Cont.)

State	Who Administers?			Administrative Costs
	State	Fiscal Agent	Comments	
North Dakota	x			
Ohio*				
Oklahoma	x			
Oregon	x			
Pennsylvania		BC		
Rhode Island	x			
South Carolina	x			
South Dakota	x			78: 34¢ per claim
Tennessee		EDSF	BC 74-77	78: 3.6% of total cost
Texas	x			
Utah	x			
Vermont		BC/BS		
Virginia		TCC		
Washington		EDSF		
West Virginia	x			78: 75¢ per claim
Wisconsin		EDSF		
Wyoming*				

provider participation over the period 1974 through 1978. Their responses may be found in Table 7-7. Participation is defined as the percentage of all pharmacies in a state that are enrolled as Medicaid providers. The table generally indicates little or no drop in participation over the five year period. One should, however, view these percentages with caution. For the most part these data are the pharmacist consultants' "educated guesses" about participation. Actual hard statistical evidence could be produced by some state programs but would require time to develop and analyze. Another problem related to participation is that while state programs keep records of those who enroll in the program, they do not maintain complete records on those that discontinued participation. For example, a pharmacy may go out of business or change hands. The state program will have no record of this unless the pharmacy notifies it. Thus, the pharmacy is still carried by the state as participating. Still another problem has to do with calculating participation rates. In many states there are out-of-state pharmacies that also provide services. While their numbers may be relatively small, counting them will increase the apparent participation rate.

This section has reported the survey results; they have not yet been utilized for MAC-EAC evaluation purposes. That will be done in Phase II of the project.

TABLE 7-7

Percentage of Total Pharmacies Participating in State Medicaid Programs

State	1974	1975	1976	1977	1978
Alabama	--	--	--	--	--
Alaska					
Arizona					
Arkansas	>90%	>90%	>90%	>90%	>90%
California	95%	95%	95%	95%	95%
Colorado	95%	95%	95%	95%	95%
Connecticut	--	--	--	--	--
Delaware	>90%	>90%	>90%	>90%	>90%
D.C.	99%	99%	99%	99%	99%
Florida	--	--	77%	77%	77%
Georgia	95%	95%	95%	95%	95%
Hawaii	--	--	--	--	--
Idaho	100%	100%	100%	100%	100%
Illinois	83%	83%	83%	83%	83%
Indiana	--	--	--	--	--
Iowa	98%	98%	98%	98%	--
Kansas	95%	95%	95%	95%	95%
Kentucky	--	--	--	88%	96%
Louisiana	--	--	--	--	--
Maine	88%	88%	88%	88%	88%
Maryland	100%	100%	100%	100%	100%
Massachusetts	95%	90%	90%	83%	75%
Michigan	100%	100%	100%	100%	100%
Minnesota	--	--	--	--	--
Mississippi	99%	99%	99%	99%	99%
Missouri	--	96%	96%	96%	99%
Montana	100%	100%	100%	100%	99%
Nebraska	99%	99%	99%	99%	99%
Nevada	95%	95%	95%	95%	95%
New Hampshire	100%	100%	100%	100%	100%
New Jersey	95%	95%	95%	95%	95%
New Mexico	96%	96%	96%	96%	96%
New York	90%+	90%+	90%+	90%+	90%+
North Carolina	--	--	--	--	--
North Dakota	90%	90%	90%	90%	90%
Ohio	--	--	--	--	--
Oklahoma	95%	95%	95%	95%	95%
Oregon	98%	98%	98%	98%	98%
Pennsylvania	80%	80%	80%	80%	80%
Rhode Island	100%	100%	100%	100%	100%
South Carolina	95%	95%	95%	95%	95%
South Dakota	98%	98%	98%	98%	98%
Tennessee	96%	96%	96%	96%	96%
Texas	80%	80%	80%	80%	80%
Utah	100%	100%	100%	100%	100%
Vermont	100%	100%	100%	100%	100%
Virginia	--	--	--	--	--
Washington	90-95%	90-95%	90-95%	90-95%	90-95%
West Virginia	90%	90%	90%	90%	90%
Wisconsin	80%	80%	80%	80%	80%
Wyoming	--	--	--	--	--

8.0 SAMPLE STATE ANALYSIS AND REPORT OF PILOT STUDY RESULTS FOR ONE STATE

This section indicates the study methodology to be employed in measuring the MAC/EAC program's impact on state Medicaid expenditures. Three major topics are covered: (1) state selection, (2) evaluation methodology, and (3) results from pilot study.

8.1 State Selection

The completed study will encompass analysis of five state Medicaid programs. One state has been used for the Phase I pilot study reported herein and four more states will be analyzed in Phase II. The following criteria were used to select the states:

- Demonstrated Record of Maintaining "Clean" Prescription Records - Availability of complete, accurate claims data is a necessary condition.
- Stable Administration of Program - The drug program administrator should be unchanged (or have few turnovers) during the study period.
- Cooperation with Federal Studies - The state should have a record of cooperating with Federal studies.
- Broad Representation of Program Sizes and Geographic Regions - The states should represent a broad cross-section according to size of program and geographic location.

The five states selected for the analysis satisfy each of these criteria. The state of Massachusetts was chosen to be the site of the pilot study. In addition to having a well-documented, stable drug program, the close proximity to the contractor's headquarters was considered beneficial in developing the procedures for data preparation and report generation.

The four other states selected for the study include Maine, Tennessee, Minnesota, and Arkansas. The state of Maine offers a drugs to the elderly program in addition to having a strong Medicaid drug program. Tennessee was the first state to have implemented a mini-MAC, while Arkansas also implemented a mini-MAC and was the first to implement a SURS II program. Minnesota employs a sliding dispensing fee based on the value of ingredient costs, which may increase the resistance of pharmacists to ingredient cost control programs.

8.2 Evaluation Methodology

The evaluation methodology prepared for this phase of the project is designed to provide dollar estimates of savings and/or additional costs associated with implementing the MAC/EAC program. The state analysis focuses only on the Medicaid program, and does not examine potential impacts in the non-Medicaid markets.

8.2.1 Time Periods

The analysis is confined to the five most recent years of experience: 1974-1978. Data are sorted into six-month periods (e.g., January-June; July-December), giving ten observations per product (5 years times 2 six-month periods). This six month grouping of data should minimize the impact of changes in the data caused by seasonal fluctuations or claims processing delays, while permitting the use of time series analysis.

8.2.2 Data Preparation

Data will be obtained from the programs' Price File and Drug Analysis Profile. Price File information includes product name, code number, and per-unit price for each month. Since the data must be aggregated into a six-month unit price, an average must be calculated, taking the simple mean of the monthly prices. The average could be weighted by number of days in the months and by some index of monthly therapeutic category utilization, but the slight degree of improvement possible from such adjustments would not warrant the higher cost. Given that most products rarely have more than one price change per 6-month period, the monthly mean should provide a good approximation of the average upper price limit for reimbursement.

The Drug Analysis Profile will provide the product code number, product description, number of prescriptions, number of units, and amount paid. If the Medicaid program has a co-payment during any of the study years, it will be necessary to adjust the amount paid to reflect the total prescription price. Once the co-payment adjustment is complete, data from the Price File will be sorted together with the data from the Drug Analysis Profile. From this combined data, an estimate can be made of the dollar value for the ingredient costs using a composite of two alternative methods:

- Dispensing Fee Alternative - One method of calculating ingredient costs is to subtract the fixed dispening fee allowance -- number of prescriptions times the dispensing fee--from total reimbursement costs for each product. This assumes that the full dispensing fee allowance was claimed for each prescription--i.e., no usual and customary limits apply--and tends to overstate the claimed value of dispensing fees. Thus, the ingredient costs will be underestimated.

- Ingredient Cost Alternative - Another estimation method involves multiplying the number of units dispensed by the maximum allowable ingredient unit cost for each product. This procedure analogously tends to overstate the claimed value for ingredient costs and understate the dispensing fee allowance.

To avoid the problems inherent in each of these methods, both techniques will be applied separately to each product and the simple average of the dollar value estimated using both methods will be considered the best estimate of actual ingredient costs. These calculations will yield a study data base that contains the following items for each product dosage form: product code number, product description, number of prescriptions, number of units, and estimated ingredient cost. This data base will encompass 10 six-month periods and will provide most of the information needed for the sample state analysis.

8.2.3 Study Tests

The state analysis will involve four basic evaluation areas: (1) MAC product tests, (2) EAC product Tests, (3) administrative costs, and (4) changes in dispensing patterns.

8.2.3.1 MAC Product Tests

Several study hypotheses revolve around an examination of the MAC products. The three principal measurable MAC hypotheses are:

- Total outpatient Medicaid reimbursements for MAC product ingredient costs are reduced by the MAC program.
- Total outpatient Medicaid reimbursements for products within a therapeutic category containing one or more MAC products are reduced by the MAC program.
- A portion of the MAC savings are offset by manufacturers increasing prices on their sole-source products.

Products receiving MACs during the last several months cannot be expected to show measurable results, so the analysis is limited to the initial fifteen dosage forms subjected to MACs:

Ampicillin	250 mg CAP 500 mg CAP 125 mg LIQ. 250 mg LIQ.
Chlordiazepoxide	5 mg CAP 10 mg CAP 25 mg CAP
Penicillin VK	250 mg TAB 500 mg TAB 125 mg LIQ. 250 mg LIQ.
Propoxyphene	65 mg CAP 65 mg CMPD. CAP
Tetracycline	250 mg CAP 500 mg CAP

The initial test involves measuring any reductions in outpatient Medicaid reimbursements for MAC products. By placing upper reimbursement limits on multiple-source products, the government expects to reduce the dollars spent on these products--and as the scope of the program grows, the total dollar savings should increase.

For each of the fifteen MAC dosage forms, a summary report will be compiled showing the changes over time in utilization patterns for all brands and/or manufacturers of the product in the program. It is anticipated that the total number of units and total ingredient costs for the high-priced brands will tend to decrease relative to the other brands. Information will be used to (1) indicate switching between brands, (2) measure the impact of physicians' prescribing "brand necessary", (3) compare time-series projections with actual experience, and (4) provide an estimate of the direct dollar savings to the government.

A second level of the MAC analysis involves an analysis of changes within therapeutic categories containing MAC products. It is expected that the categories' costs will decrease, but if industry promotion is successful in convincing physicians to prescribe other therapeutically-equivalent products in place of MAC products, the overall savings for the category may be less than the direct savings.

To review changes over time within the therapeutic category, all brands of a given dosage form will be combined together in a single item to assist in identifying movements between products. An additional report specifying each brand of the dosage forms also will be compiled for review. Once the data is compiled, it will be necessary to consider the impact of varying unit measures (eg., tablets, liquids, sprays, etc.) and dosages. Measures providing special significance for this analysis will be number of prescriptions and ingredient cost per prescription. Special attention will be paid to changes over time and to introductions of new products that may have affected the demand for products in the specific category.

A third level of analysis involves examining changes in the price of the manufacturer's other products to determine whether cost savings in MAC products are being offset by price increases in non-MAC products. While the basic approach to this measure may appear straightforward, several cautions are warranted:

- Pricing Trends - The pricing strategy of many pharmaceutical firms has been significantly altered by many factors including inflationary pressures, changes in marketing strategy, and realignment of foreign currency exchange rates. As a result, many drug product prices have soared dramatically during the past two years. Causes for price increases must be carefully considered before attributing price changes to the MAC impact.

- Time Lags - Marketing strategies for large companies are often established several years in advance. As a result, there may be no measurable change in manufacturers' pricing strategy even though they are carefully monitoring the MAC program. Given that the MAC program's greatest impact is on outpatient Medicaid drug programs, which only represent 15% of the total prescription market, the likelihood of not discovering a measurable impact is fairly high.

A review of manufacturers' pricing practices will be conducted by preparing summary printouts of the full product lines of companies that are (1) most affected by the MAC program, and (2) relatively unaffected by the MAC program. The companies most affected by the five MAC products include:

Bristol - Ampicillin (Polycillin)
Lederle - Tetracycline (Achromycin)
Lilly - Penicillin VK (V-Cillin-K)
- Propoxyphene (Darvon)
Roche - Chlordiazepoxide (Librium)
Squibb - Ampicillin (Principen)
Wyeth - Penicillin VK (Pen-Vee-K)

Companies least affected by MAC will be used as a control group. Evaluation of the data will require recognizing that EAC limits may affect the measurable ingredient cost pricing changes for the non-MAC products.

8.2.3.2 EAC Product Tests

The primary study hypothesis for the EAC products is:

- Total outpatient Medicaid reimbursements for EAC product ingredient costs are reduced by the MAC program.

Since states are allowed wide latitude in setting EAC pricing levels, the analysis must be tailored to fit individual state requirements.

If specific products are "targeted" for lower EAC reimbursement levels because of direct purchases or larger package sizes, the analytical techniques designed for testing the first MAC hypothesis will be employed. For other EAC systems, separate mechanisms and procedures will be developed if data are available. Changes in dispensing fee that are specifically targeted to "offset" EAC reimbudsement reductions will be identified in this section.

8.2.3.3 Administrative Costs

The evaluation of administrative costs will focus on incremental cost, rather than total cost measures. Given that many aspects of implementing the MAC program involve shifting personnel from one function to another without increasing total manpower, the net increase in costs associated with the MAC program will be substantially less than total MAC-related costs.

Administrative costs will cover both implementation costs and operation costs. Implementation costs will include manpower assigned to the MAC and EAC pricing files, costs of bulleting and mailings, programming necessary to accomodate

The MAC program, development of physician "brand necessary" override mechanism, cost of a dispensing cost survey, and other similar costs. Operating costs include expenses for handling physician overrides and any other special administrative task.

8.2.3.4 Changes in Dispensing Patterns

The changes in dispensing patterns will be available from a review of the percent of MAC product prescriptions dispensed for high priced brands. Additionally, the override mechanism to allow physicians the opportunity to certify brands will be monitored to determine the level of override activity occurring in the Medicaid programs.

8.3 Results from Pilot Study

The state of Massachusetts' Medicaid Drug Program provided the data used in the pilot study analysis. Massachusetts has had the same drug program administrator (Pilgrim Health Systems) since Fall 1973, so the data are relatively comparable and consistent over the study period.

8.3.1 Massachusetts' MAC/EAC Implementation

The Massachusetts Medicaid Program began implementation of the MAC portion of the program in the summer of 1977, but went through several phases before the implementation was finalized. Initial implementation involved notifying participating pharmacies of the MAC progam and entering the MAC per-unit price limit into the Price File for none-branded ampicillin (June 27, 1977) and for non-branded pencillin VK (October 25, 1977). This policy was continued through the first half of 1978, as the state imposed the MAC price limitations only on the non-branded products--tetracycline HCL (April 10, 1978), propoxyphene HCL (April 24, 1978), and chlordiazepoxide HCL (May 18, 1978). Prices for the leading brands of the MAC products were not reduced to the MAC level.

Since the MAC per-unit price was higher than the prices contained in the Price File for some non-branded MAC products, the net effect would be higher reimbursement for such products. Pharmacists were expected to switch to the non-branded products and were allowed to submit claims for reimbursement of the higher-priced brands without verification of brand-necessary certification.

This initial MAC implementation did not result in the anticipated substitution of lower-priced brands, so on June 15, 1978, the state inserted the MAC per-unit prices into the Price File for every brand of the MAC products. An override mechanism for reimbursing "brand necessary" claims was instituted at the same time. A positive impact from the MAC program is thus only noted in the second half of our ninth study period (April 1978 - September 1978) and for the entire tenth study period (October 1978 - March 1979). The MAC savings projections contained in this report derive from these last two study periods.

The state nevertheless continued to use the MAC price as the upper-price limit for reimbursement of non-branded MAC Products throughout the study interval. That is, the state had taken the MAC prices as being the estimated acquisition costs (EACs) for these products, even though former reimbursement limits were sometimes lower. As will be seen, the state pharmacies were claiming reimbursement for non-branded MAC products at the MAC price level. This tended to increase the reimbursement cost for non-branded MAC products, compared to what it would otherwise have been, and somewhat limited the cost savings achieved by the MAC program.

The EAC program adopted by the Massachusetts Rate Setting commission consisted of three parts. Rather than use Average Wholesale Price (AWP) for a standard package size, drug products are assigned to one of the following cost categories:

- Direct Price - Products purchased form certain manufacturers are reimbursed at the direct price. The state's initial list of direct price products included 42 non-MAC dosage forms.
- Volume Wholesale Price - Selected products are reimbrused at the per unit rate for larger package sizs, less a five (5) percent discount. The state's initial list of volume wholesale products included 20 non-MAC dosage forms and 6 MAC dosage forms.
- Average Wholesale Price and Wholesale Price - Other products are reimbursed at the Wholesale price, less a five (5) percent discount.

The EAC price limitations were entered into the Price File on September 14, 1978, so the impact of the EAC prices should be noted after that date.

8.3.2. Time Periods

The inital study design suggested the use of six month time perioids ending in December and June. However, the use of a June ending date was questioned during a meeting with representatives from Pilgrim Health Systesm. The state's fiscal year ends in June, and whenever state funding is low or delays occur in the legislative budgeting process, payment of submitted claims is delayed until July or August. The resultant claims payment tapes overstate claims activity in the July-December period, while understanding claims activity in the January-June period.

To avoid this claims payment problem, the time periods were shifted by three months. Study periods were revised to encompass the six-month periods April - September and October - March. The ten time periods selected for the pilot study are listed below:

Time Period	Months/Year
1	April 1974 - September 1974
2	October 1974 - March 1975
3	April 1975 - September 1975
4	October 1975 - March 1976
5	April 1976 - September 1976
6	October 1976 - March 1977
7	April 1977 - September 1977
8	October 1977 - March 1978
9	April 1978 - September 1978
10	October 1978 - March 1979

8.3.3 Data Preparation

Two sets of data tapes were supplied by the state: (1) copy of Price File, including last six prices, and (2) copies of Drug Usage Reports, covering each of the ten study periods. The Price File covered more than 6,000 product dosage forms and contained per-unit prices and dates for the six latest price changes. Most products had fewer than six price changes since April 1974, so they required no adjustments. However, a total of 322 product dosage forms required further examination.

Red Book AWP prices for the 322 products were compiled for January 1 of 1974, 1975, 1976 and 1977. These values were compared with the oldest price in the file to determine whether an adjustment was required. A total 224 of the 322 products had January 1, 1974 AWP prices similar to the earliest file price, so no adjustment was made. For the remaining 98 products, the pricing file was augmented by the addition of one or more prices. This augmented Price File then was used to prepare weighted average per-unit prices for each product in each of the ten study periods.

The Drug Usage Reports identified product dosage forms sorted by therapeutic categories. Product code numbers contained in the reports were used to identify specific products needed for the analysis. For example, three product codes were required to identify the MAC product chlordiazepoxide HCL, 5 MG CAPS: 1525-Librium/Roche, 4539-Sk-Lygen/SKF, and 2075-chlordiazepoxide HCL/Misc. Product codes were compiled to identify all manufacturers of the 15 MAC dosage forms, 68 EAC volume or direct purchase products, 4 therapeutic categories with brands grouped together by product dosage form, and the full product lines of 10 manufacturers. More than 2,000 product codes were involved in preparing these groupings for the computer reports.

The reimbursement amounts shown in the Drug Usage Reports contain both ingredient costs and dispensing fee. As a result, ingredient costs were estimated using the technique described in Section 8.2.2. This estimation method was appropriate for tablets, but created problems in dealing with liquids and other non-tablet items (such as sprays, creams, etc). Claim submissions for non-tablet drugs sometimes list units in terms of number of bottles, number of ounces, number of ml, number of packs, and so forth. These sporadic changes in the method for counting the number of units created excessive variability in the per-unit cost calculations derived from the dispensing fee estimation approach. As a result, analysis of costs involving non-tablet products was limited to the ingredient cost estimation alternative.

Computer analyses were conducted using the Massachusetts data and a copy of the output has been provided to HCFA as a Technical Appendix. These computer reports identify the number of prescriptions, number of units, total reimbursements, total value of ingredient costs (based on average per-unit cost), average ingredient cost per unit, average ingredient cost per prescription, average number of units per prescription and per-unit cost using each estimation alternative, for each product dosage form. The reports contained the following breakdowns:

- **MAC Products**
  - Chlordiazepoxide HCL, 5 MG CAPS
  - Chlordiazepoxide HCL, 10 MG CAPS
  - Chlordiazepoxide HCL, 25 MG CAPS
  - Propoxyphene HCL, 65 MG CAPS
  - Propoxyphene HCL, 65 MG CMPD CAPS
  - Ampicillin, 250 MG CAPS
  - Ampicillin, 500 MG CAPS
  - Ampicillin, 125 MG LIQ
  - Ampicillin, 250 MG LIQ
  - Penicillin VK, 250 MG TABS
  - Penicillin VK, 500 MG TABS
  - Penicillin VK, 125 MG LIQ
  - Penicillin VK, 250 MG LIQ
  - Tetracycline HCL, 250 MG CAPS
  - Tetracycline HCL, 500 MG CAPS

- **Volume/Direct EAC Products**
  - EAC Price Volume - Non-MAC Products
  - EAC Price Volume - MAC Products
  - EAC Price Direct - Non-MAC Products
  - EAC Price Direct - MAC Products

- **Therapeutic Category Reports**
  - Ataractic Tranquilizers
  - Broad and Medium Spectrum Antibiotics
  - Non-Narcotic Analgesics
  - Penicillins

- **Manufacturer Reports**
  - Abbott
  - Burroughs-Wellcome
  - Lederle
  - Lilly
  - Merck, Sharp and Dohme
  - Pfizer
  - Roche
  - Smith, Kline, French
  - Squibb
  - Upjohn

Data compiled from these reports provided most of the information used in the analyses reported here.

8.3.4 MAC Product Tests

This section estimates the total dollar savings achieved by the Massachusetts Medicaid Program from implementation of the MAC price limits. The savings achieved by each product dosage form is calculated, and then compared with reimbursement for other products in the therapeutic category. An analysis of the pricing strategy of selected manufacturers is conducted.

8.3.4.1 Chlordiazepoxide HCL

Three dosage forms of chlordiazepoxide HCL were subjected to MAC price limitations:

Dosage Form	MAC Price
5 MG	$ .0270 / CAP
10 MG	.0378 / CAP
25 MG	.0640 / CAP

Tables 8-1, 8-2, and 8-3 display the Massachusetts Medicaid Program experience with cost per unit, ingredient cost per Rx, percentage of ingredient cost, percentage units, and percentage Rx for the various manufacturers of chlordiazepoxide. Since experience with the three dosage forms is virtually identical, a single description of the results will suffice.

Description of Trends. -- Roche's Librium was the dominant brand in the early periods because of patent protection and brand-name recognition. Although a large number of manufacturers marketed chlordiazepoxide after patent expiration, Librium controlled 90% of the prescriptions and 95% of the ingredient cost reimbursements through the eighth study period. This position was changed when the MAC prices were entered into the Price File. By Period 10, Librium only accounted for about 25% of the prescriptions and 25% of the dollars on submitted claims.

Trends in per-unit costs and cost per Rx also indicate the impact of the MAC program. Librium's per-unit costs, and hence the total per-unit costs, were steadily increasing through Period 8. Afterwards, the per-unit costs dropped by nearly 50%.

Savings Projections. -- The savings derived from each of the dosage forms are given in Tables 8-4, 8-5, and 8-6. Using simple regression analysis, a straight line was fitted to the costs per unit and cost per Rx figures for Periods 1 through 8. The results from these equations then were used to project what the cost would have been for Periods 9 and 10 if the trends exhibited in the first 8 periods had continued. This difference between actual experience and projected values was multiplied by the actual number of units and Rxs dispensed during a period to obtain an estimate of the savings. If the cost per unit is used as the basis for estimating savings, the ingredient cost savings on chlordiazepoxide HCL are estimated to have been $43,046 for Period 9 and $66,518 for Period 10. If cost per Rx is used, the savings are estimated to have been $44,309 for Period 9 and $68,013 for Period 10.

Therapeutic Category. -- Chlordiazepoxide HCL belongs to the therapeutic category of ataractic tranquilizers. The largest selling product in this category is diazepam, which is marketed exclusively by Roche under the brand name Valium. Since Roche manufactures both diazepam and chlordiazepoxide, the claims experience for these two products during the past five periods is highlighted in Table 8-7.

More than 95% of all ataractic tranquilizer prescriptions are written for tablets and capsules, so the total figures shown in the table have been limited to tablets and capsules. The overall utilization pattern shown in the table indicates a gradual decline in the percent of ataractic tranquilizer prescriptions written for both chlordiazepoxide and diazepam.

TABLE 8-1

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Chlordiazepoxide, 5 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of		
			Ingred. Cost	Units	Rxs
Librium/Roche					
1- 4/74-- 9/74	.0523	2.6423	100.0	100.0	100.0
2- 10/74 - 3/75	.0523	2.8066	100.0	100.0	100.0
3- 4/75 - 9/75	.0525	2.9087	99.9	99.9	99.9
4- 10/75 - 3/76	.0532	2.9820	99.9	99.8	99.9
5- 4/76 - 9/76	.0546	3.1232	99.6	99.3	99.4
6- 10/76 - 3/77	.0563	3.3195	98.7	97.2	97.4
7- 4/77 - 9/77	.0564	3.3516	96.9	93.6	94.1
8- 10/77 - 3/78	.0585	3.5554	94.6	88.8	89.1
9- 4/78 - 9/78	.0439	2.7214	79.8	70.6	71.3
10- 10/78 - 3/79	.0265	1.7049	27.8	27.3	26.5
SK-Lygen/SKF					
1- 4/74 - 9/74	.0000	.0000	--	--	--
2- 10/74 - 3/75	.0000	.0000	--	--	--
3- 4/75 - 9/75	.0000	.0000	--	--	--
4- 10/75 - 3/76	.0000	.0000	--	--	--
5- 4/76 - 9/76	.0271	1.6290	.1	.1	.1
6- 10/76 - 3/77	.0272	1.5313	.2	.4	.4
7- 4/77 - 9/77	.0272	1.6889	.2	.4	.3
8- 10/77 - 3/78	.0255	1.2098	.1	.1	.2
9- 4/78 - 9/78	.0240	1.3865	.3	.5	.5
10- 10/78 - 3/79	.0226	1.3277	.9	1.0	1.1
Chlordiazepoxide HCL/Misc.					
1- 4/74 - 9/74	.0000	.0000	--	--	--
2- 10/74 - 3/75	.0000	.0000	--	--	--
3- 4/75 - 9/75	.0306	2.7505	.1	.1	.1
4- 10/75 - 3/76	.0289	2.4294	.1	.2	.1
5- 4/76 - 9/76	.0287	1.8391	.3	.6	.5
6- 10/76 - 3/77	.0260	1.6309	1.1	2.4	2.2
7- 4/77 - 9/77	.0263	1.6840	2.9	6.0	5.6
8- 10/77 - 3/78	.0264	1.6757	5.3	11.1	10.7
9- 4/78 - 9/78	.0267	1.7106	19.9	28.9	28.2
10- 10/78 - 3/79	.0260	1.6015	71.3	71.7	72.4
Totals					
1- 4/74 - 9/74	.0523	2.6423	100.0	100.0	100.0
2- 10/74 - 3/75	.0523	2.8066	100.0	100.0	100.0
3- 4/75 - 9/75	.0525	2.9086	100.0	100.0	100.0
4- 10/75 - 3/76	.0531	2.9813	100.0	100.0	100.0
5- 4/76 - 9/76	.0544	3.1159	100.0	100.0	100.0
6- 10/76 - 3/77	.0554	3.2747	100.0	100.0	100.0
7- 4/77 - 9/77	.0545	3.2525	100.0	100.0	100.0
8- 10/77 - 3/78	.0549	3.3503	100.0	100.0	100.0
9- 4/78 - 9/78	.0389	2.4293	100.0	100.0	100.0
10- 10/78 - 3/79	.0261	1.6259	100.0	100.0	100.0

TABLE 8-2

Cost Per Unit, Cost Per Rx, and Percent Represented by Brands of Chlordiazepoxide HCL, 10 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of Ingred. Cost	Percent of Units	Percent of Rxs
Librium/Roche					
1- 4/74 - 9/74	.0681	3.4865	100.0	100.0	100.0
2- 10/74 - 3/75	.0682	3.6702	100.0	100.0	100.0
3- 4/75 - 9/75	.0680	3.8397	99.9	99.9	99.9
4- 10/75 - 3/76	.0697	4.0421	99.9	99.7	99.8
5- 4/76 - 9/76	.0744	4.4133	99.6	99.2	99.2
6- 10/76 - 3/77	.0788	4.8132	98.6	97.0	97.0
7- 4/77 - 9/77	.0789	4.8903	96.7	92.9	93.3
8- 10/77 - 3/78	.0813	5.0662	95.1	89.3	89.5
9- 4/78 - 9/78	.0614	3.9321	80.7	71.3	71.0
10- 10/78 - 3/79	.0375	2.3952	27.2	26.5	26.9
SK-Lygen/SKF					
1- 4/74 - 9/74	.0000	.0000	--	--	--
2- 10/74 - 3/75	.0000	.0000	--	--	--
3- 4/75 - 9/75	.0000	.0000	--	--	--
4- 10/75 - 3/76	.0000	.0000	--	--	--
5- 4/76 - 9/76	.0387	.8710	.1	.1	.1
6- 10/76 - 3/77	.0386	1.9717	.1	.1	.2
7- 4/77 - 9/77	.0386	2.1277	.1	.2	.3
8- 10/77 - 3/78	.0365	2.4727	.1	.2	.2
9- 4/78 - 9/78	.0350	2.3786	.4	.7	.6
10- 10/78 - 3/79	.0338	2.1796	.8	.8	.9
Chlordiazepoxide HCL/Misc.					
1- 4/74 - 9/74	.0000	.0000	--	--	--
2- 10/74 - 3/75	.0000	.0000	--	--	--
3- 4/75 - 9/75	.0309	3.6512	.1	.1	.1
4- 10/75 - 3/76	.0358	2.1831	.1	.3	.2
5- 4/76 - 9/76	.0365	2.3907	.4	.8	.7
6- 10/76 - 3/77	.0331	2.1988	1.3	3.0	2.8
7- 4/77 - 9/77	.0350	2.3129	3.2	6.9	6.5
8- 10/77 - 3/78	.0352	2.2205	4.8	10.5	10.3
9- 4/78 - 9/78	.0366	2.3074	18.9	28.0	28.4
10- 10/78 - 3/79	.0362	2.3607	72.0	72.7	72.2
Totals					
1- 4/74 - 9/74	.0681	3.4865	100.0	100.0	100.0
2- 10/74 - 3/75	.0682	3.6702	100.0	100.0	100.0
3- 4/75 - 9/75	.0680	3.8396	100.0	100.0	100.0
4- 10/75 - 3/76	.0696	4.0374	100.0	100.0	100.0
5- 4/76 - 9/76	.0741	4.3977	100.0	100.0	100.0
6- 10/76 - 3/77	.0774	4.7349	100.0	100.0	100.0
7- 4/77 - 9/77	.0758	4.7164	100.0	100.0	100.0
8- 10/77 - 3/78	.0764	4.7669	100.0	100.0	100.0
9- 4/78 - 9/78	.0543	3.4617	100.0	100.0	100.0
10- 10/78 - 3/79	.0365	2.3684	100.0	100.0	100.0

TABLE 8-3

Cost Per Unit, Cost Per Rx, and Percent Represented by Brands of Chlordiazepoxide HCL, 25 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of		
			Ingred. Cost	Units	Rxs
Librium/Roche					
1- 4/74-- 9/74	.0973	4.5080	100.0	100.0	100.0
2- 10/74 - 3/75	.0974	4.7981	100.0	100.0	100.0
3- 4/75 - 9/75	.0983	5.0081	99.9	99.9	99.9
4- 10/75 - 3/76	.1020	5.3443	99.4	98.9	99.1
5- 4/76 - 9/76	.1126	6.1147	99.3	98.4	98.5
6- 10/76 - 3/77	.1232	6.8259	98.6	96.5	96.3
7- 4/77 - 9/77	.1233	6.9745	96.6	92.5	92.3
8- 10/77 - 3/78	.1273	7.3142	96.0	91.2	90.9
9- 4/78 - 9/78	.0994	5.8934	80.7	71.8	71.7
10- 10/78 - 3/79	.0650	4.0259	25.5	24.6	24.2
SK-Lygen/SKF					
1- 4/74 - 9/74	.0000	.0000	--	--	--
2- 10/74 - 3/75	.0000	.0000	--	--	--
3- 4/75 - 9/75	.0000	.0000	--	--	--
4- 10/75 - 3/76	.0000	.0000	--	--	--
5- 4/76 - 9/76	.0000	.0000	--	--	--
6- 10/76 - 3/77	.0530	3.2024	.2	.6	.5
7- 4/77 - 9/77	.0532	3.5190	.5	1.2	1.0
8- 10/77 - 3/78	.0501	2.9261	.3	.6	.6
9- 4/78 - 9/78	.0424	2.3216	.5	1.0	1.0
10- 10/78 - 3/79	.0407	2.8038	1.0	1.5	1.3
Chlordiazepoxide HCL/Misc.					
1- 4/74 - 9/74	.0000	.0000	--	--	--
2- 10/74 - 3/75	.0000	.0000	--	--	--
3- 4/75 - 9/75	.0535	2.6206	.1	.1	.1
4- 10/75 - 3/76	.0520	3.4336	.6	1.1	.9
5- 4/76 - 9/76	.0520	3.0588	.7	1.6	1.5
6- 10/76 - 3/77	.0488	2.4913	1.2	2.9	3.2
7- 4/77 - 9/77	.0545	2.8726	2.9	6.3	6.7
8- 10/77 - 3/78	.0551	3.0212	3.7	8.2	8.5
9- 4/78 - 9/78	.0613	3.6235	18.8	27.2	27.3
10- 10/78 - 3/79	.0624	3.7584	73.5	73.9	74.5
Totals					
1- 4/74 - 9/74	.0973	4.5080	100.0	100.0	100.0
2- 10/74 - 3/75	.0974	4.7981	100.0	100.0	100.0
3- 4/75 - 9/75	.0983	5.0062	100.0	100.0	100.0
4- 10/75 - 3/76	.1015	5.3271	100.0	100.0	100.0
5- 4/76 - 9/76	.1116	6.0693	100.0	100.0	100.0
6- 10/76 - 3/77	.1206	6.6700	100.0	100.0	100.0
7- 4/77 - 9/77	.1182	6.6636	100.0	100.0	100.0
8- 10/77 - 3/78	.1210	6.9229	100.0	100.0	100.0
9- 4/78 - 9/78	.0885	5.2371	100.0	100.0	100.0
10- 10/78 - 3/79	.0627	3.8105	100.0	100.0	100.0

TABLE 8-4

Projected Savings Estimates, Chlordiazepoxide HCL, 5MG CAPS

April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	.0389	.0261
- Projected*	.0558	.0562
- Difference	.0169	.0301
Number of Units	357,881	313,656
Projected Savings (Costs)	$6,048	$9,441
Savings based on Rxs:		
Cost Per Rx - Actual	2.4293	1.6259
- Projected**	3.4925	3.5927
- Difference	1.0632	1.9668
Number of Rxs	5,727	5,034
Projected Savings (Costs)	$6,089	$9,901

* Based on y-intercept of .0516, slope of .0005, and simple correlation coefficient of .905.

** Based on y-intercept of 2.5905, slope of .1002, and simple correlation coefficient of .984.

TABLE 8-5

Peojected Savings Estimates, Chlordiazepoxide HCL, 10 MG CAPS, April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	.0543	.0365
- Projected*	.0791	.0806
- Difference	.0248	.0441
Number of Units	1,061,866	921,745
Projected Savings (Costs)	$26,334	$40,649
Savings based on Rxs:		
Cost Per Rx - Actual	3.4617	2.3684
- Projected**	5.1298	5.3350
- Difference	1.6681	2.9666
Number of Rxs	16,649	14,216
Projected Savings (Costs)	$27,772	$42,173

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* Based on y-intercept of .0653, slope of .0015, and simple correlation coefficient of .913.

** Based on y-intercept of 3.2826, slope of .2052, and simple correlation coefficient of .976.

TABLE 8-6

Projected Savings Estimates, Chlordiazepoxide HCL, 25 MG CAPS, April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	.0885	.0627
- Projected*	.1268	.1310
- Difference	.0383	.0683
Number of Units	278,439	240,528
Projected Savings (Costs)	$10,664	$16,428
Savings based on Rxs:		
Cost Per Rx - Actual	5.2371	3.8105
- Projected**	7.4581	7.8386
- Difference	2.2210	4.0281
Number of Rxs	4,704	3,957
Projected Savings (Costs)	$10,448	$15,939

* Based on y-intercept of .0897 , slope of .0041 , and simple correlation coefficient of .942.

** Based on y-intercept of 4.0332 , slope of .3805 , and simple correlation coefficient of .980.

TABLE 8-7

Number of Prescriptions and Ingredient Costs for Selected Ataractic Tranquilizer Products, October 1976 - March 1979

Time Period Product	Prescriptions		Ingredient Costs		Cost Per Rx	
	Number	Percent	Amount	Percent	Amount	% Change fr Prior Perio
Period 6:						
Chlordiazepoxide	31,273	9.7%	$ 148,290.68	8.2%	$4.74	--
Diazepam	109,712	34.0	595,675.54	32.8	5.43	--
All Other	181,478	56.3	1,073,416.16	59.1	5.91	--
TOTAL - TABS	322,463	100.0	1,817,382.38	100.0	5.64	--
Period 7:						
Chlordiazepoxide	29,017	9.4%	$ 137,253.72	7.6%	$4.73	- 0.2%
Diazepam	106,231	34.3	587,073.34	32.4	5.53	+ 1.8
All Other	174,400	56.3	1,086,234.26	60.0	6.23	+ 5.4
TOTAL - TABS	309,648	100.0	1,810,561.32	100.0	5.85	+ 3.7
Period 8:						
Chlordiazepoxide	27,374	8.7%	$ 131,645.67	6.9%	$4.81	+ 1.7%
Diazepam	104,878	33.4	600,422.95	31.6	5.72	+ 3.4
All Other	181,375	57.8	1,169,335.73	61.5	6.45	+ 3.5
TOTAL - TABS	313,627	100.0	1,901,404.35	100.0	6.06	+ 3.6
Period 9:						
Chlordiazepoxide	27,080	8.2%	$ 96,182.21	4.7%	$3.55	-26.2%
Diazepam	102,171	31.1	610,757.83	29.6	5.98	+ 4.5
All Other	199,332	60.7	1,353,624.54	65.7	6.79	+ 4.6
TOTAL - TABS	328,583	100.0	2,060,564.58	100.0	6.27	+ 3.5
Period 10:						
Chlordiazepoxide	23,207	7.6%	$ 56,932.48	3.0%	$2.45	-31.0%
Diazepam	87,646	28.8	539,059.73	28.6	6.15	+ 2.8
All Other	193,246	63.5	1,291,040.93	68.4	6.68	- 1.6
TOTAL - TABS	304,099	100.0	1,887,033.14	100.0	6.21	- 1.0

The cost per Rx figures indicate that chlordiazepoxide pricing patterns differ from the other products in the therapeutic category; chlordiazepoxide does not exhibit the cost increases noted for the other products. Also, diazepam cost increases were at or below the levels of the other products for all but the last period. The overall decrease in costs for Period 10 are a result of EAC implementation, as described in Section 8.3.4.

The therapeutic category figures indicate that the savings noted for chlordiazepoxide were not a result of overall price decreases in this therapeutic category. As a result, it can be concluded that the MAC program had an impact on the reimbursements for this product.

The response of Roche to lower chlordiazepoxide sales cannot be inferred from this data. However, it is not apparent that any significant substitution of Valium for Librium is occurring. Additionally, costs of diazepam generally rose at a slower pace than did the average for other ataractic tranquilizers, which suggests there was not an immediate response by Roche to raise Valium's price to cover any reductions in Librium. However, Period 10 data indicates a faster price increase for Valium, potentially caused by several factors: (1) reduced numbers of Valium prescriptions may have resulted in price increases designed to maintain sales revenue from Valium, (2) devalued U.S. dollars may have encouraged Swiss-based Roche to raise prices to provide constant "converted" earnings from its U.S. division and (3) reductions in revenue from Librium may have led to price increases on the sole-source product.

8.3.4.2 Propoxyphene HCL

Two dosage forms of propoxyphene HCL were subjected to MAC price limitations:

Dosage Form	MAC Price
65 MG	$ .0317 / CAP
65 MG CMPD	.0330 / CAP

Tables 8-8 and 8-9 indicate the Massachusetts Medicaid Program experience with costs per unit, ingredient cost per Rx, and percentages of ingredient cost, units, and Rxs for the various manufacturers of propoxyphene.

Description of Trends. -- Lilly's Darvon and Darvon Compound were the dominant brands in the earlier periods. Although numerous manufacturers market propoxyphen Darvon controlled more than 80% of the prescriptions and 90% of the ingredient cost reimbursements through the eighth study period. This position was changed when MAC prices were entered into the Price File. By Period 10, Darvon only accounted for 21% of the prescriptions, while Darvon Compounds represented 24.5% of the prescriptions.

Trends in per-unit costs and cost per Rx also indicate the impact of the MAC program. Per-unit costs for Darvon and Darvon Compound increased steadily through Period 8, and then dropped dramatically after implementation of MAC. Lederle's Dolene also experienced a decrease in per-unit costs because of MAC limits, while SKF's SK-65 had costs that were at or below the MAC level. The Period 9 increase in per-unit cost for miscellaneous manufacturers was a direct result of the state's raising the allowable reimbursement level for non-branded products up to the MAC level.

Savings Projections. -- The savings derived from both dosage forms are estimated in Tables 8-10 and 8-11. Straight-line regression analysis was used for projection of costs by propoxyphene dosage form. The savings on propoxyphene HCL ingredient cost, derived from a cost per unit computation, are estimated at $38,201 for Period 9 and $57,044 for Period 10. If cost per Rx is used, the savings are estimated at $42,810 for Period 9 and $62,875 for Period 10.

Therapeutic Category. -- Propoxyphene HCL belongs to the therapeutic category of non-narcotic analgesics. The four largest selling product groups in this category are propoxyphene HCL and compound, propoxyphene napsylate and compound, butalbital w/APC, and pentazocine. The claims experience for these four products during the past five periods is highlighted in Table 8-12. More than 98% of the non-narcotic analgesic prescriptions are written for tablets and capsules, so the total figures shown in the table have been limited to tablets and capsules.

The therapeutic category figures indicate that the savings noted for propoxyphene HCL were not a result of overall price decreases in this category. As a result it can be concluded that the MAC program had an impact on the reimbursement for this product.

The utilization and pricing figures for propoxyphene napsylate deserve attention because of this products relationship to propoxyphene HCL. Lilly markets propoxyphene napsylate under the brand name Darvon-N, and since Darvon-N is still covered by patent protection, Lilly's marketing strategy in non-narcotic analgesics has been to convince physicians to prescribe Darvon-N instead of Darvon. This strategy appears to have achieved some success, as the percent of non-narcotic analgesic prescriptions accounted for by propoxyphene napsylate products has risen from 27.0 percent to 34.4 percent in just 30 months, while propoxyphene HCL prescriptions have decreased from 35.6 percent to 24.8 percent.

Lilly began this marketing strategy about ten years ago, so the continuing "switch" to Darvon-N during the study period probably cannot be attributed to the MAC program.

There does not appear to have been a pricing response by Lilly to the MAC program. The prices of propoxyphene napsylate have risen at about the same rate as the other non-MAC products in the non-narcotic analgesic therapeutic category.[1]

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[1] Propoxyphene napsylate and all other proxyphene-based products except simple propoxyphene were subsequently removed from the formulary in Massachusetts.

TABLE 8-8

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Propoxyphene HCL, 65 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of Ingred. Cost		
			Ingred. Cost	Units	Rxs
Darvon/Lilly					
1- 4/74 - 9/74	.0703	3.2686	97.5	94.8	94.8
2- 10/74 - 3/75	.0697	3.4996	97.3	93.2	93.5
3- 4/75 - 9/75	.0694	3.6689	95.7	89.2	89.7
4- 10/75 - 3/76	.0695	3.8239	94.6	86.6	87.4
5- 4/76 - 9/76	.0694	3.9254	94.3	85.3	85.7
6- 10/76 - 3/77	.0707	4.0684	93.6	83.1	84.1
7- 4/77 - 9/77	.0724	4.1816	93.5	82.1	82.2
8- 10/77 - 3/78	.0740	4.2446	92.9	79.4	80.1
9- 4/78 - 9/78	.0555	3.2644	76.5	62.3	62.3
10- 10/78 - 3/79	.0314	1.8231	21.3	20.7	21.0
Dolene/Lederle					
1- 4/74 - 9/74	.0396	1.6245	.6	1.1	1.2
2- 10/74 - 3/75	.0405	1.6767	.8	1.4	1.7
3- 4/75 - 9/75	.0422	1.6957	1.1	1.8	2.3
4- 10/75 - 3/76	.0425	1.7840	1.4	2.2	2.8
5- 4/76 - 9/76	.0430	1.7343	1.2	1.8	2.6
6- 10/76 - 3/77	.0450	2.2022	1.3	1.8	2.1
7- 4/77 - 9/77	.0448	2.1515	1.2	1.7	2.0
8- 10/77 - 3/78	.0427	2.1322	1.1	1.6	1.8
9- 4/78 - 9/78	.0357	1.8447	.9	1.2	1.3
10- 10/78 - 3/79	.0313	1.7133	.9	.9	.9
SK-65/SKF					
1- 4/74 - 9/74	.0358	1.2939	.7	1.3	1.7
2- 10/74 - 3/75	.0355	1.6080	.6	1.1	1.2
3- 4/75 - 9/75	.0354	1.6850	.9	1.6	1.8
4- 10/75 - 3/76	.0359	2.3527	1.0	1.8	1.6
5- 4/76 - 9/76	.0357	2.0410	.9	1.5	1.5
6- 10/76 - 3/77	.0358	2.3114	.8	1.4	1.3
7- 4/77 - 9/77	.0355	2.0316	.6	1.0	1.1
8- 10/77 - 3/78	.0313	2.0731	.5	1.0	.9
9- 4/78 - 9/78	.0279	1.5625	.7	1.1	1.1
10- 10/78 - 3/79	.0268	1.6037	1.2	1.3	1.3
Propoxyphene HCL/ Misc.					
1- 4/74 - 9/74	.0281	1.6470	1.2	2.8	2.3
2- 10/74 - 3/75	.0200	1.2028	1.3	4.3	3.6
3- 4/75 - 9/75	.0198	1.2573	2.3	7.4	6.2
4- 10/75 - 3/76	.0198	1.2494	3.0	9.4	8.2
5- 4/76 - 9/76	.0198	1.2520	3.6	11.4	10.2
6- 10/76 - 3/77	.0197	1.2573	4.3	13.7	12.5
7- 4/77 - 9/77	.0196	1.1763	4.7	15.2	14.7
8- 10/77 - 3/78	.0195	1.1809	5.5	18.0	17.2
9- 4/78 - 9/78	.0280	1.6540	21.9	35.4	35.3
10- 10/78 - 3/79	.0303	1.7881	76.6	77.1	76.8

TABLE 8-8, cont.

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Propoxyphene HCL, 65 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of Ingred. Cost	Percent of Units	Percent of Rxs
Totals					
1- 4/74-- 9/74	.0683	3.1783	100.0	100.0	100.0
2- 10/74 - 3/75	.0668	3.3635	100.0	100.0	100.0
3- 4/75 - 9/75	.0647	3.4381	100.0	100.0	100.0
4- 10/75 - 3/76	.0637	3.5307	100.0	100.0	100.0
5- 4/76 - 9/76	.0628	3.5675	100.0	100.0	100.0
6- 10/76 - 3/77	.0628	3.6564	100.0	100.0	100.0
7- 4/77 - 9/77	.0635	3.6759	100.0	100.0	100.0
8- 10/77 - 3/78	.0633	3.6597	100.0	100.0	100.0
9- 4/78 - 9/78	.0452	2.6588	100.0	100.0	100.0
10- 10/78 - 3/79	.0305	1.7923	100.0	100.0	100.0

TABLE 8-9

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Propoxyphene HCL, 65 MG CMPD CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of		
			Ingred. Cost	Units	Rxs
Darvon/Lilly					
1- 4/74-- 9/74	.0728	2.9402	98.2	96.3	96.4
2- 10/74 - 3/75	.0722	3.0903	98.0	95.4	95.5
3- 4/75 - 9/75	.0723	3.2785	96.6	91.7	92.1
4- 10/75 - 3/76	.0724	3.4618	95.9	90.0	90.8
5- 4/76 - 9/76	.0724	3.5649	95.7	89.5	90.2
6- 10/76 - 3/77	.0738	3.7188	95.0	87.2	87.8
7- 4/77 - 9/77	.0753	3.7474	94.7	85.8	86.5
8- 10/77 - 3/78	.0769	3.8787	94.7	85.0	85.8
9- 4/78 - 9/78	.0576	3.0484	80.0	67.8	68.2
10- 10/78 - 3/79	.0325	1.7103	24.3	23.8	24.5
Dolene/Lederle					
1- 4/74 - 9/74	.0413	1.2712	.4	.6	.8
2- 10/74 - 3/75	.0419	1.4928	.6	1.1	1.3
3- 4/75 - 9/75	.0439	1.6610	1.1	1.8	2.1
4- 10/75 - 3/76	.0445	1.7992	1.4	2.2	2.6
5- 4/76 - 9/76	.0451	1.8724	1.3	2.0	2.4
6- 10/76 - 3/77	.0475	1.9947	1.3	1.8	2.2
7- 4/77 - 9/77	.0453	2.1001	1.3	1.9	2.1
8- 10/77 - 3/78	.0435	2.0550	1.0	1.7	1.8
9- 4/78 - 9/78	.0384	2.0305	1.1	1.3	1.4
10- 10/78 - 3/79	.0325	1.8449	1.6	1.6	1.5
SK-65/SKF					
1- 4/74 - 9/74	.0374	1.4242	.8	1.6	1.7
2- 10/74 - 3/75	.0367	1.4569	.6	1.2	1.3
3- 4/75 - 9/75	.0370	1.5308	.7	1.3	1.4
4- 10/75 - 3/76	.0373	1.6747	.7	1.2	1.3
5- 4/76 - 9/76	.0373	1.9001	.7	1.3	1.3
6- 10/76 - 3/77	.0373	1.9482	.7	1.3	1.3
7- 4/77 - 9/77	.0375	1.9079	.6	1.2	1.2
8- 10/77 - 3/78	.0344	1.7706	.5	1.1	1.1
9- 4/78 - 9/78	.0317	1.6158	1.0	1.5	1.6
10- 10/78 - 3/79	.0302	1.5768	2.4	2.5	2.6
Propoxyphene HCL/ Misc.					
1- 4/74 - 9/74	.0302	1.5679	.6	1.5	1.1
2- 10/74 - 3/75	.0210	1.0699	.7	2.3	1.9
3- 4/75 - 9/75	.0209	1.1595	1.6	5.3	4.4
4- 10/75 - 3/76	.0209	1.2569	2.0	6.6	5.3
5- 4/76 - 9/76	.0208	1.2142	2.2	7.2	6.1
6- 10/76 - 3/77	.0208	1.1679	3.0	9.7	8.7
7- 4/77 - 9/77	.0208	1.1345	3.4	11.1	10.3
8- 10/77 - 3/78	.0207	1.1448	3.7	12.2	11.3
9- 4/78 - 9/78	.0298	1.6185	17.9	29.4	28.8
10- 10/78 - 3/79	.0317	1.7323	71.7	72.0	71.3

TABLE 8-9, cont.

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Propoxyphene HCL, 65 MG CMPD CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of Ingred. Cost		
			Ingred. Cost	Units	Rxs
Totals					
1- 4/74 - 9/74	.0714	2.8855	100.0	100.0	100.0
2- 10/74 - 3/75	.0703	3.0094	100.0	100.0	100.0
3- 4/75 - 9/75	.0686	3.1275	100.0	100.0	100.0
4- 10/75 - 3/76	.0680	3.2786	100.0	100.0	100.0
5- 4/76 - 9/76	.0677	3.3592	100.0	100.0	100.0
6- 10/76 - 3/77	.0677	3.4359	100.0	100.0	100.0
7- 4/77 - 9/77	.0682	3.4235	100.0	100.0	100.0
8- 10/77 - 3/78	.0690	3.5147	100.0	100.0	100.0
9- 4/78 - 9/78	.0488	2.5999	100.0	100.0	100.0
10- 10/78 - 3/79	.0319	1.7245	100.0	100.0	100.0

TABLE 8-10

Projected Savings Estimates, Propoxyphene HCL, 65 MG CAPS

April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	.0452	.0305
- Projected*	.0614	.0607
- Difference	.0162	.0302
Number of Units	787,960	639,560
Projected Savings (Costs)	$12,765	$19,315
Savings based on Rxs:		
Cost Per Rx - Actual	2.6588	1.7923
- Projected**	3.8100	3.8770
- Difference	1.1512	2.0847
Number of Rxs	13,402	10,868
Projected Savings (Costs)	$15,428	$22,657

* Based on y-intercept of .0676, slope of -.0007, and simple correlation coefficient of .838.

** Based on y-intercept of 3.2075, slope of .0669, and simple correlation coefficient of .943.

TABLE 8-11

Projected Savings Estimates, Propoxyphene HCL, 65 MG CMPD CAPS,

April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	.0488	.0319
- Projected*	.0672	.0669
- Difference	.0184	.0350
Number of Units	1,382,387	1,077,967
Projected Savings (Costs)	$25,436	$37,729
Savings based on Rxs:		
Cost Per Rx - Actual	2.5999	1.7245
- Projected**	3.6550	3.7441
- Difference	1.0551	2.0196
Number of Rxs	25,952	19,914
Projected Savings (Costs)	$27,382	$40,218

* Based on y-intercept of .0705 , slope of -.0004 , and simple correlation coefficient of .662 .

** Based on y-intercept of 2.8535 , slope of .0891 , and simple correlation coefficient of .971 .

TABLE 8-12

Number of Prescriptions and Ingredient Costs for Selected Non-Narcotic Analgesics, October 1976 - March 1979

Time Period Product	Prescriptions		Ingredient Costs		Cost Per Rx	
	Number	Percent	Amount	Percent	Amount	% Change from Prior Period
Period 6:						
Propoxephene HCL + CMPD	53,479	35.6%	$ 187,349.01	35.0%	$3.50	--
Propoxyphene Napsylate + CMPD	40,583	27.0	159,630.20	29.8	3.93	--
Butalbital w/APC	18,601	12.4	34,249.98	6.4	1.84	--
Pentazocine TAB/CAP	12,922	8.6	61,154.01	11.4	4.73	--
All Others	24,806	16.5	92,510.45	17.3	3.73	--
TOTAL - TABS	150,391	100.0	534,893.65	100.0	3.56	--
Period 7:						
Propoxyphene HCL + CMPD	44,652	31.9%	$ 156,475.82	30.2%	$3.50	0.0%
Propoxyphene Napsylate + CMPD	39,634	28.3	162,529.91	31.4	4.10	+ 4.3
Butalbital w/APC	19,071	13.6	36,978.66	7.1	1.94	+ 5.4
Pentazocine TAB/CAP	12,671	9.1	63,804.57	12.3	5.04	+ 6.6
All Others	23,792	17.0	98,556.24	19.0	4.14	+11.0
TOTAL - TABS	139,820	100.0	518,345.20	100.0	3.71	+ 4.2
Period 8:						
Propoxyphene HCL + CMPD	42,419	30.1%	$ 151,073.41	26.8%	$3.56	+ 1.7%
Propoxyphene Napsylate + CMPD	43,242	30.7	186,118.88	33.0	4.30	+ 4.9
Butalbital w/APC	19,275	13.7	39,646.94	7.0	2.06	+ 6.2
Pentazocine TAB/CAP	12,223	8.7	63,969.17	11.3	5.23	+ 3.8
All Others	23,809	16.9	122,913.64	21.8	5.16	+24.6
TOTAL - TABS	140,968	100.0	563,722.04	100.0	4.00	+ 7.8
Period 9:						
Propoxyphene HCL + CMPD	39,354	27.6%	$ 103,105.21	18.5%	$2.62	-26.4%
Propoxyphene Napsylate + CMPD	46,837	32.9	218,852.68	39.3	4.67	+ 8.6
Butalbital w/APC	18,694	13.1	45,740.71	8.2	2.45	+18.9
Pentazocine TAB/CAP	12,841	9.0	69,693.02	12.5	5.43	+ 3.8
All Others	24,829	17.4	119,111.05	21.4	4.80	- 7.0
TOTAL - TABS	142,555	100.0	556,502.67	100.0	3.90	- 2.5

TABLE 8-12, cont.

Number of Prescriptions and Ingredient Costs for Selected Non-Narcotic Analgesics, October 1976 - March 1979

Time Period Product	Prescriptions		Ingredient Costs		Cost Per Rx	
	Number	Percent	Amount	Percent	Amount	% Change from Prior Period
Period 10:						
Propoxyphene HCL + CMPD	30,782	24.8%	$ 53,820.91	11.6%	$1.75	-33.2%
Propoxyphene Napsylate + CMPD	42,682	34.4	199,763.69	43.1	4.68	+ 0.2
Butalbital w/APC	16,734	13.5	38,480.98	8.3	2.30	- 6.1
Pentazocine TAB/CAP	10,882	8.8	61,877.29	13.4	5.69	+ 4.8
All Others	22,927	18.5	109,362.75	23.6	4.77	- 0.6
TOTAL - TAB	124,007	100.0	463,305.62	100.0	3.74	- 4.1

8.3.4.3 Ampicillin

Four dosage forms of ampicillin were subjected to MAC price limitations:

Dosage Form	MAC Price
250 MG	$.0725/CAP
500 MG	.1390/CAP
125 MG LIQ	.0145/cc
250 MG LIQ	.0205/cc

Tables 8-13, 8-14, 8-15, and 8-16 indicate reimbursement experience with costs per unit, ingredient cost per Rx, and percentages of ingredient costs, units, and Rxs for the various manufacturers. The tables for liquids give the cost per bottle and estimate ingredient costs by multiplying the number of Rxs by this cost per bottle figure.[1]

Description of Trends. There appears to have been intense competition in the ampicillin market prior to imposition of the MAC price. By the eighth study period, miscellaneous ampicillin manufacturers accounted for 88.4% of the 250 MG CAP prescriptions, 90.7% of the 500 MG CAP prescriptions, 78.9% of the 125 MG LIQ prescriptions, and 76.9% of the 250 MG LIQ prescriptions. Such extensive penetration of the market by miscellaneous manufacturers meant the potential for savings due to setting a MAC price limit were rather limited. Sales of the two most prominent higher-price brands. Polycillin (Bristol) and Principen (Squibb), had also been steadily decreasing prior to MAC introduction.

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[1] This assumes, unrealistically, that only one bottle is dispensed per prescription and implies that total ingredient cost is somewhat underestimated. Inconsistancy of unit measurement in the data necessitated prevented more straight forward estimation of the ingredient costs. Despite the slight downward bias in the estimates of total ingredient cost, the comparative (percentage) figures will be unbiased.

The increasing penetration of the market by miscellaneous manufacturers has resulted in decreasing ingredient cost reimbursements for ampicillin products.

Although most of the brand name manufacturers have maintained relatively constant unit costs, the figure for the total product category declines over time because of the shift in market share toward lower-priced miscellaneous manufacturers prescriptions.

A net loss due to the state's initial MAC implementation is indicated in the ampicillin/miscellaneous portion of the tables. Cost per unit and cost per prescription increased between periods 7 and 8. These increases resulted because the state allowed reimbursement of miscellaneous ampicillin at the MAC price limit, a higher price limit than had formerly been used.

Savings Projections. The savings derived from the four dosage forms are estimated in Tables 8-17, 8-18, 8-19, and 8-20. Utilizing the linear regression analysis, the projected figures indicate that the MAC program has actually increased reimbursement for ampicillin, entailing a net loss due to MAC. The estimated additional costs using the per-unit projections are $10,448 for Period 9 and $13,707 for Period 10, and using the prescription projections, $8,120 and $9,056.[1]

Additional costs are projected for two reasons. First, the average unit and prescription costs were decreasing throughout the study period due to the intense competition in the ampicillin market. As a result, the projections indicated a continuously decreasing price, and even though the prices for ampicillin capsules continued to decrease in Periods 9 and 10, the projection implied a somewhat greater decrease than was actually realized. Second, the application of the MAC price limit to miscellaneous ampicillin has led to an increase in reimbursement that has more than offset the reduction in reimbursement of the higher-priced brand name products which had only accounted for 10% to 20% of the ampicillin market anyway. If the ratio between percentage ingredient cost and percentage prescriptions had been constant in going from Period 7 to Period 8, the state's total reimbursement would have been reduced as follows: $3,043 for 250 MG CAPS, $3,123 for 500 MG CAPS, $1,459 for 125 MG LIQ, and $1,919 for 250 MG LIQ. The estimated additional cost for miscellaneous manufacturers totals $9,544, roughly the same amount as the reimbursement loss projected above.

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[1] All liquid projections were based on the cost per bottle difference times number of prescriptions.

Therapeutic Category. Ampicillin belongs to the therapeutic category penicillin, also having another MAC product, penicillin VK. The largest selling products in this category are ampicillin, penicillin VK, and penicillin G potassium. These three products collectively account for about 85 percent of prescriptions and 65 percent of ingredient cost reimbursement. The claims experience for these products during the past five periods is shown in Tables 8-21 (tablets) and Table 8-22 (liquids).

The therapeutic category figures indicate that ampicillin has maintained its market share, while experiencing an overall reduction in relative ingredient cost due to a relative decline in per-unit price. Between Periods 6 and 10, average ampicillin ingredient cost per prescription decreased from $3.18 to $3.02, while the cost per prescription in the All Other category increased from $6.45 to $8.04.

TABLE 8-13

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Ampicillin, 250 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of		
			Ingred. Cost	Units	Rxs
Amcill/ Parke-Davis					
1- 4/74 - 9/74	.1463	4.2724	4.9	3.7	3.6
2- 10/74 - 3/75	.1459	4.3856	7.4	5.5	5.3
3- 4/75 - 9/75	.1276	3.8641	6.0	4.9	4.8
4- 10/75 - 3/76	.1113	3.3824	4.3	3.7	3.7
5- 4/76 - 9/76	.1097	3.3415	3.8	3.1	3.1
6- 10/76 - 3/77	.1085	3.4104	3.1	2.2	2.2
7- 4/77 - 9/77	.1089	3.5351	2.5	1.8	1.7
8- 10/77 - 3/78	.1061	4.0835	1.3	.9	.7
9- 4/78 - 9/78	.0762	3.1953	1.1	1.1	.8
10- 10/78 - 3/79	.0693	2.9168	1.0	.9	.7
Omnipen/Wyeth					
1- 4/74 - 9/74	.1091	3.4806	8.5	8.6	7.7
2- 10/74 - 3/75	.1100	3.3587	8.2	8.0	7.6
3- 4/75 - 9/75	.1082	3.4517	7.6	7.3	6.9
4- 10/75 - 3/76	.1092	3.5221	7.1	6.2	5.8
5- 4/76 - 9/76	.1103	3.2117	5.6	4.5	4.8
6- 10/76 - 3/77	.1100	3.4775	5.8	4.1	3.9
7- 4/77 - 9/77	.1085	3.6217	4.5	3.2	3.0
8- 10/77 - 3/78	.1030	3.5253	3.6	2.6	2.4
9- 4/78 - 9/78	.0870	3.1052	2.6	2.1	2.0
10- 10/78 - 3/79	.0692	2.4434	1.6	1.5	1.4
Penbritin/Ayerst					
1- 4/74 - 9/74	.1444	3.9959	7.6	5.8	6.0
2- 10/74 - 3/75	.1437	3.9577	7.3	5.5	5.8
3- 4/75 - 9/75	.1434	3.9259	7.1	5.2	5.7
4- 10/75 - 3/76	.1444	3.9920	6.5	4.3	4.7
5- 4/76 - 9/76	.1444	4.1641	4.8	3.0	3.1
6- 10/76 - 3/77	.1442	4.0714	3.2	1.7	1.9
7- 4/77 - 9/77	.1443	4.6161	2.1	1.1	1.1
8- 10/77 - 3/78	.1425	4.2967	.9	.5	.5
9- 4/78 - 9/78	.1087	3.2981	.6	.4	.4
10- 10/78 - 3/79	.0729	1.8071	.1	.1	.1
Polycillin/Bristol					
1- 4/74 - 9/74	.1473	3.5144	18.5	14.0	16.6
2- 10/74 - 3/75	.1572	3.7961	16.7	11.5	13.8
3- 4/75 - 9/75	.1723	4.2689	15.3	9.3	11.2
4- 10/75 - 3/76	.1814	4.5935	14.3	7.6	9.1
5- 4/76 - 9/76	.1851	4.5802	12.7	6.2	7.6
6- 10/76 - 3/77	.1866	4.7373	9.6	4.0	4.9
7- 4/77 - 9/77	.1861	5.0873	6.2	2.6	3.0
8- 10/77 - 3/78	.1864	4.6288	2.9	1.2	1.5
9- 4/78 - 9/78	.1261	3.4432	.8	.5	.6
10- 10/78 - 3/79	.0659	1.8450	.2	.2	.2

TABLE 8-13, cont.

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Ampicillin, 250 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of Ingred. Cost	Percent of Units	Percent of Rxs
Principen/Squibb					
1- 4/74 - 9/74	.1502	4.0469	18.4	13.6	14.3
2- 10/74 - 3/75	.1488	4.1558	20.0	14.5	15.0
3- 4/75 - 9/75	.1483	4.4053	20.3	14.3	14.4
4- 10/75 - 3/76	.1477	4.5228	18.6	12.1	12.0
5- 4/76 - 9/76	.1462	4.4348	16.2	10.0	10.0
6- 10/76 - 3/77	.1458	4.2823	10.7	5.7	5.9
7- 4/77 - 9/77	.1451	4.4412	9.2	4.8	5.0
8- 10/77 - 3/78	.1412	4.3066	3.6	1.9	2.0
9- 4/78 - 9/78	.1063	3.4409	1.6	1.1	1.1
10- 10/78 - 3/79	.0699	2.1126	.6	.6	.6
SK-Ampicillin/SKF					
1- 4/74 - 9/74	.1200	3.3782	6.0	5.5	5.6
2- 10/74 - 3/75	.1191	3.4953	8.3	7.5	7.4
3- 4/75 - 9/75	.1188	3.4924	9.0	7.9	8.0
4- 10/75 - 3/76	.1183	3.4055	8.9	7.2	7.6
5- 4/76 - 9/76	.1115	3.2231	8.8	7.1	7.5
6- 10/76 - 3/77	.0743	2.1044	4.8	5.0	5.5
7- 4/77 - 9/77	.0721	2.0929	3.7	3.9	4.3
8- 10/77 - 3/78	.0643	1.7452	2.0	2.4	2.8
9- 4/78 - 9/78	.0570	1.5761	1.1	1.4	1.6
10- 10/78 - 3/79	.0485	1.3472	.5	.7	.9
Other Brands/Misc.	N/A	N/A			
1- 4/74 - 9/74			11.7	10.0	9.7
2- 10/74 - 3/75			10.9	9.0	9.0
3- 4/75 - 9/75			10.5	9.0	8.9
4- 10/75 - 3/76			7.5	7.0	6.9
5- 4/76 - 9/76			7.3	5.9	5.9
6- 10/76 - 3/77			5.2	3.9	3.6
7- 4/77 - 9/77			4.0	3.2	3.0
8- 10/77 - 3/78			2.4	1.9	1.7
9- 4/78 - 9/78			1.8	1.5	1.4
10- 10/78 - 3/79			1.1	1.2	1.2
Ampicillin/Misc.					
1- 4/74 - 9/74	.0697	2.0992	24.4	38.8	36.5
2- 10/74 - 3/75	.0596	1.8392	21.2	38.5	36.1
3- 4/75 - 9/75	.0600	1.8830	24.2	42.1	40.1
4- 10/75 - 3/76	.0608	1.9029	32.8	51.9	50.2
5- 4/76 - 9/76	.0610	1.9297	40.8	60.2	58.0
6- 10/76 - 3/77	.0610	1.9055	57.6	73.4	72.1
7- 4/77 - 9/77	.0656	2.0884	67.8	79.4	78.9
8- 10/77 - 3/78	.0710	2.2539	83.3	88.6	88.4
9- 4/78 - 9/78	.0711	2.3237	90.4	91.9	92.1
10- 10/78 - 3/79	.0674	2.2198	94.9	94.8	94.9

TABLE 8-13, cont.

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Ampicillin, 250 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of		
			Ingred. Cost	Units	Rxs
Totals					
1- 4/74 - 9/74	.1108	3.1431	100.0	100.0	100.0
2- 10/74 - 3/75	.1079	3.1243	100.0	100.0	100.0
3- 4/75 - 9/75	.1046	3.1233	100.0	100.0	100.0
4- 10/75 - 3/76	.0962	2.9141	100.0	100.0	100.0
5- 4/76 - 9/76	.0898	2.7395	100.0	100.0	100.0
6- 10/76 - 3/77	.0777	2.3849	100.0	100.0	100.0
7- 4/77 - 9/77	.0767	2.4300	100.0	100.0	100.0
8- 10/77 - 3/78	.0756	2.3904	100.0	100.0	100.0
9- 4/78 - 9/78	.0723	2.3674	100.0	100.0	100.0
10- 10/78 - 3/79	.0673	2.2190	100.0	100.0	100.0

TABLE 8-14

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Ampicillin, 500 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of Ingred. Cost	Percent of Units	Percent of Rxs
Amcill/Parke-Davis					
1- 4/74 - 9/74	.2697	7.5112	6.0	4.6	4.6
2- 10/74 - 3/75	.2754	8.2611	7.6	5.5	5.4
3- 4/75 - 9/75	.2449	7.6097	8.8	7.0	6.8
4- 10/75 - 3/76	.2057	6.6202	5.9	5.1	4.8
5- 4/76 - 9/76	.1995	7.1067	5.5	4.6	4.0
6- 10/76 - 3/77	.1998	6.3410	3.6	2.6	2.6
7- 4/77 - 9/77	.2039	7.4082	3.0	2.1	1.9
8- 10/77 - 3/78	.1947	6.2584	1.4	1.1	1.1
9- 4/78 - 9/78	.1474	4.9320	.9	.8	.8
10- 10/78 - 3/79	.1286	3.8247	.6	.6	.7
Omnipen/Wyeth					
1- 4/74 - 9/74	.2177	6.0079	5.8	5.5	5.6
2- 10/74 - 3/75	.2167	6.1636	7.7	7.1	7.2
3- 4/75 - 9/75	.2146	6.2632	6.0	5.5	5.6
4- 10/75 - 3/76	.2161	6.0036	4.8	3.9	4.3
5- 4/76 - 9/76	.2175	6.2595	4.5	3.4	3.7
6- 10/76 - 3/77	.2159	6.6932	4.7	3.1	3.2
7- 4/77 - 9/77	.2085	6.8601	3.9	2.7	2.6
8- 10/77 - 3/78	.1955	6.1647	2.5	1.8	1.8
9- 4/78 - 9/78	.1647	5.7096	2.0	1.7	1.6
10- 10/78 - 3/79	.1314	4.0887	.9	.9	1.0
Penbritin/Ayerst					
1- 4/74 - 9/74	.2810	7.8879	6.9	5.1	5.1
2- 10/74 - 3/75	.2795	8.1955	7.4	5.3	5.3
3- 4/75 - 9/75	.2791	8.2213	6.7	4.7	4.8
4- 10/75 - 3/76	.2803	8.5062	5.9	3.7	3.7
5- 4/76 - 9/76	.2802	8.3888	4.0	2.3	2.4
6- 10/76 - 3/77	.2399	9.1776	2.8	1.7	1.4
7- 4/77 - 9/77	.2311	9.7165	2.3	1.4	1.1
8- 10/77 - 3/78	.2474	10.1175	.8	.5	.4
9- 4/78 - 9/78	.1957	4.9411	.1	.1	.1
10- 10/78 - 3/79	.1239	6.1482	.1	.1	.1
Polycillin/Bristol					
1- 4/74 - 9/74	.2860	6.7395	15.0	10.8	12.9
2- 10/74 - 3/75	.3032	7.4408	14.5	9.6	11.3
3- 4/75 - 9/75	.3246	8.6424	11.7	7.1	7.9
4- 10/75 - 3/76	.3550	9.0049	10.1	5.0	6.0
5- 4/76 - 9/76	.3609	9.4743	8.6	3.9	4.6
6- 10/76 - 3/77	.3617	10.0125	4.7	1.9	2.1
7- 4/77 - 9/77	.3597	8.5732	2.7	1.1	1.5
8- 10/77 - 3/78	.3275	8.4106	1.4	.6	.8
9- 4/78 - 9/78	.2576	5.9886	.5	.3	.4
10- 10/78 - 3/79	.1094	3.7129	.1	.2	.2

TABLE 8-14, cont.

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Ampicillin, 500 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of Ingred. Cost	Percent of Units	Percent of Rxs
Principen/Squibb					
1- 4/74 - 9/74	.2921	7.7076	21.9	15.5	16.4
2- 10/74 - 3/75	.2915	8.2022	23.5	16.1	16.6
3- 4/75 - 9/75	.2910	8.5686	24.0	16.2	16.5
4- 10/75 - 3/76	.2902	8.4424	19.2	11.6	12.1
5- 4/76 - 9/76	.2889	8.5994	16.0	9.1	9.6
6- 10/76 - 3/77	.2830	8.2754	11.1	5.6	6.0
7- 4/77 - 9/77	.2824	8.3973	7.9	4.0	4.4
8- 10/77 - 3/78	.2654	7.6543	2.4	1.3	1.5
9- 4/78 - 9/78	.1959	6.1061	1.2	.8	.9
10- 10/78 - 3/79	.1942	4.1080	.8	.8	.9
SK-Ampicillin/SKF					
1- 4/74 - 9/74	.2301	6.2869	4.3	3.9	3.9
2- 10/74 - 3/75	.2296	6.6247	5.9	5.1	5.2
3- 4/75 - 9/75	.2287	6.8233	6.5	5.5	5.6
4- 10/75 - 3/76	.2267	6.4570	7.4	5.7	6.1
5- 4/76 - 9/76	.2084	6.3897	7.0	5.5	5.6
6- 10/76 - 3/77	.1428	4.1319	3.1	3.1	3.4
7- 4/77 - 9/77	.1383	4.1329	2.2	2.3	2.5
8- 10/77 - 3/78	.1218	3.5432	1.5	1.7	1.9
9- 4/78 - 9/78	.1094	3.3653	1.1	1.4	1.5
10- 10/78 - 3/79	.0968	2.9209	.5	.7	.7
Other Brands/Misc.	N/A	N/A			
1- 4/74 - 9/74			9.7	8.0	8.2
2- 10/74 - 3/75			9.5	7.5	7.7
3- 4/75 - 9/75			10.3	8.5	8.7
4- 10/75 - 3/76			7.8	6.8	6.7
5- 4/76 - 9/76			7.2	5.7	5.8
6- 10/76 - 3/77			5.3	3.8	3.9
7- 4/77 - 9/77			3.4	2.5	2.4
8- 10/77 - 3/78			2.3	1.8	1.8
9- 4/78 - 9/78			1.7	1.5	1.4
10- 10/78 - 3/79			1.1	1.1	.7
Ampicillin/Misc.					
1- 4/74 - 9/74	.1346	4.0545	30.4	46.6	43.3
2- 10/74 - 3/75	.1091	3.3665	23.9	43.8	41.3
3- 4/75 - 9/75	.1122	3.4742	26.0	45.5	44.1
4- 10/75 - 3/76	.1174	3.6795	38.9	58.2	56.3
5- 4/76 - 9/76	.1185	3.7753	47.2	65.5	64.3
6- 10/76 - 3/77	.1188	3.7813	64.7	78.2	77.4
7- 4/77 - 9/77	.1266	4.1169	74.6	83.9	83.6
8- 10/77 - 3/78	.1371	4.4877	87.7	91.2	90.7
9- 4/78 - 9/78	.1379	4.5332	92.5	93.4	93.3
10- 10/78 - 3/79	.1319	4.3021	95.9	95.6	95.7

TABLE 8-14, cont.

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Ampicillin, 500 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of		
			Ingred. Cost	Units	Rxs
Totals					
1- 4/74 - 9/74	.2064	5.7710	100.0	100.0	100.0
2- 10/74 - 3/75	.1998	5.8087	100.0	100.0	100.0
3- 4/75 - 9/75	.1959	5.8733	100.0	100.0	100.0
4- 10/75 - 3/76	.1758	5.3317	100.0	100.0	100.0
5- 4/76 - 9/76	.1643	5.1397	100.0	100.0	100.0
6- 10/76 - 3/77	.1434	4.5205	100.0	100.0	100.0
7- 4/77 - 9/77	.1423	4.6126	100.0	100.0	100.0
8- 10/77 - 3/78	.1426	4.6403	100.0	100.0	100.0
9- 4/73 - 9/78	.1392	4.5716	100.0	100.0	100.0
10- 10/78 - 3/79	.1315	4.2906	100.0	100.0	100.0

TABLE 8-15

Cost Per Unit, Number of Prescriptions, and Percent Represented by Brands of Ampicillin, 125 MG LIQ, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Bottle	No. Rxs	Estimated Ingredient Cost	Percent of	
				Ingredient Cost	Rxs
Amcill/ Parke-Davis					
1- 4/74 - 9/74	2.5673	328	842.07	4.9	4.4
2- 10/74 - 3/75	2.8245	536	1,513.93	7.4	5.8
3- 4/75 - 9/75	2.8247	493	1,392.58	7.7	6.3
4- 10/75 - 3/76	2.7621	377	1,041.31	5.2	4.2
5- 4/76 - 9/76	2.8238	331	934.68	4.9	3.8
6- 10/76 - 3/77	2.7314	212	578.97	3.4	2.7
7- 4/77 - 9/77	2.7956	214	598.26	4.5	3.4
8- 10/77 - 3/78	2.7955	199	556.30	3.2	2.7
9- 4/78 - 9/78	2.2949	110	252.44	1.8	1.9
10- 10/78 - 3/79	2.5157	90	226.41	1.6	1.5
Omnipen/ Wyeth					
1- 4/74 - 9/74	1.9789	989	1,957.13	11.4	13.2
2- 10/74 - 3/75	1.7530	1257	2,203.52	10.8	13.7
3- 4/75 - 9/75	1.9845	1064	2,111.51	11.7	13.7
4- 10/75 - 3/76	2.0097	1119	2,248.85	11.2	12.5
5- 4/76 - 9/76	2.0610	841	1,733.30	9.2	9.6
6- 10/76 - 3/77	2.0932	594	1,243.36	7.3	7.6
7- 4/77 - 9/77	2.1043	448	942.73	7.2	7.2
8- 10/77 - 3/78	2.0621	393	810.41	4.6	5.3
9- 4/78 - 9/78	1.9467	246	478.89	3.4	4.2
10- 10/78 - 3/79	1.8975	175	332.06	2.3	2.9
Penbritin/ Ayerst					
1- 4/74 - 9/74	1.9191	250	479.78	2.8	3.3
2- 10/74 - 3/75	1.8180	302	549.04	2.7	3.3
3- 4/75 - 9/75	1.8618	289	538.06	3.0	3.7
4- 10/75 - 3/76	1.8394	259	476.40	2.4	2.9
5- 4/76 - 9/76	1.9386	174	337.32	1.8	2.0
6- 10/76 - 3/77	1.7653	69	121.81	.7	.9
7- 4/77 - 9/77	1.8900	48	90.72	.7	.8
8- 10/77 - 3/78	1.7889	28	50.09	.3	.4
9- 4/78 - 9/78	1.6011	12	19.21	.0	.2
10- 10/78 - 3/79	1.5336	5	7.67	.0	.0
Polycillin/ Bristol					
1- 4/74 - 9/74	2.4616	1004	2,471.45	14.3	13.4
2- 10/74 - 3/75	2.9612	1228	3,636.35	17.8	13.4
3- 4/75 - 9/75	3.1396	918	2,882.15	15.9	11.8
4- 10/75 - 3/76	3.3976	861	2,925.33	14.6	9.6
5- 4/76 - 9/76	3.3180	723	2,398.91	12.7	8.2
6- 10/76 - 3/77	4.1744	431	1,799.17	10.6	5.5
7- 4/77 - 9/77	4.1499	238	987.68	7.5	3.8
8- 10/77 - 3/78	4.5722	105	480.08	2.7	1.4
9- 4/78 - 9/78	3.3017	70	231.12	1.7	1.2
10- 10/78 - 3/79	2.3115	45	104.02	.7	.7

TABLE 8-15, cont.

Cost Per Unit, Number of Prescriptions, and Percent Represented by Brands of Ampicillin, 125 MG LIQ, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Bottle	No. Rxs	Estimated Ingredient Cost	Percent of	
				Ingredient Cost	Rxs
Principen/ Squibb					
1- 4/74 - 9/74	2.5446	1743	4,435.24	25.7	23.3
2- 10/74 - 3/75	2.6849	2050	5,504.05	26.9	22.3
3- 4/75 - 9/75	2.7481	1510	4,149.63	22.9	19.4
4- 10/75 - 3/76	2.7686	1396	3,864.97	19.2	15.6
5- 4/76 - 9/76	2.8210	1180	3,328.78	17.6	13.4
6- 10/76 - 3/77	2.7506	700	1,925.42	11.3	9.0
7- 4/77 - 9/77	2.7952	409	1,143.24	8.7	6.5
8- 10/77 - 3/78	2.8598	299	855.08	4.9	4.0
9- 4/78 - 9/78	2.5082	132	331.08	2.4	2.3
10- 10/78 - 3/79	2.3673	69	163.34	1.1	1.1
SK-Ampicillin/ SKF					
1- 4/74 - 9/74	1.7367	349	606.11	3.5	4.7
2- 10/74 - 3/75	1.5337	574	880.34	4.3	6.3
3- 4/75 - 9/75	1.7547	522	915.95	5.1	6.7
4- 10/75 - 3/76	1.8877	695	1,311.95	6.5	7.8
5- 4/76 - 9/76	1.5978	707	1,129.64	6.0	8.1
6- 10/76 - 3/77	1.4387	370	532.32	3.1	4.8
7- 4/77 - 9/77	1.3497	204	275.34	2.1	3.3
8- 10/77 - 3/78	1.3116	230	301.67	1.7	3.1
9- 4/78 - 9/78	1.0866	98	106.49	.8	1.7
10- 10/78 - 3/79	.6473	30	19.42	.1	.5
Other Brands/ Misc.	N/A		N/A	N/A	
1- 4/74 - 9/74		589			7.9
2- 10/74 - 3/75		908			9.9
3- 4/75 - 9/75		780			10.0
4- 10/75 - 3/76		753			8.4
5- 4/76 - 9/76		622			7.1
6- 10/76 - 3/77		390			5.0
7- 4/77 - 9/77		289			4.6
8- 10/77 - 3/78		315			4.2
9- 4/78 - 9/78		137			2.3
10- 10/78 - 3/79		92			1.5
Ampicillin/ Misc.					
1- 4/74 - 9/74	2.2724	2244	5,099.27	29.6	29.9
2- 10/74 - 3/75	1.8097	2329	4,214.84	20.6	25.4
3- 4/75 - 9/75	1.8310	2218	4,061.16	22.5	28.5
4- 10/75 - 3/76	1.7729	3505	6,214.01	30.9	39.1
5- 4/76 - 9/76	1.7788	4199	7,469.18	39.5	47.8
6- 10/76 - 3/77	1.8236	5000	9,118.00	53.6	64.4
7- 4/77 - 9/77	1.8254	4410	8,050.01	61.1	70.4
8- 10/77 - 3/78	2.2897	5881	13,465.73	76.8	78.9
9- 4/78 - 9/78	2.4038	5050	12,139.19	87.4	86.3
10- 10/78 - 3/79	2.5108	5524	13,869.66	95.4	91.6

TABLE 8-15, cont.

Cost Per Unit, Number of Prescriptions, and Percent Represented by Brands of Ampicillin, 125 MG LIQ, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Bottle	No. Rxs	Estimated Ingredient Cost	Percent of	
				Ingredient Cost	Rxs
TOTALS					
1- 4/74 - 9/74	2.2998	7496	17,239.30	100.0	100.0
2- 10/74 - 3/75	2.2279	9184	20,461.03	100.0	100.0
3- 4/75 - 9/75	2.3201	7794	18,082.86	100.0	100.0
4- 10/75 - 3/76	2.2396	8965	20,078.01	100.0	100.0
5- 4/76 - 9/76	2.1522	8777	18,889.86	100.0	100.0
6- 10/76 - 3/77	2.1913	7766	17,017.64	100.0	100.0
7- 4/77 - 9/77	2.1052	6260	13,178.55	100.0	100.0
8- 10/77 - 3/78	2.3542	7450	17,538.79	100.0	100.0
9- 4/78 - 9/78	2.3720	5855	13,888.06	100.0	100.0
10- 10/78 - 3/79	2.4113	6030	14,540.14	100.0	100.0

Table 8-16

Cost Per Unit, Number of Prescriptions, and Percent Represented by Brands of Ampicillin, 250 MG LIQ, April 1, 974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Bottle	No. Rxs	Estimated Ingredient Cost	Percent of Ingredient Cost	Percent of Rxs
Ampicillin/ Parke-Davis					
1- 4/74 - 9/74	4.2684	707	3017.76	4.8	4.5
2- 10/74 - 3/75	4.5359	1220	5533.80	7.2	5.8
3- 4/75 - 9/75	4.5869	1139	5224.48	8.0	6.4
4- 10/75 - 3/76	4.6535	1003	4667.46	5.9	4.8
5- 4/76 - 9/76	4.5196	802	3624.72	5.2	4.2
6- 10/76 - 3/77	4.4694	422	1886.09	3.0	2.5
7- 4/77 - 9/77	4.5165	335	1513.03	3.2	2.4
8- 10/77 - 3/78	4.8550	319	1548.75	2.5	1.9
9- 4/78 - 9/78	3.1325	247	773.73	1.6	1.8
10- 10/78 - 3/79	3.0289	191	578.52	1.2	1.4
Omnipx/ Wyeth					
1- 4/74 - 9/74	3.4404	1774	6103.27	9.7	11.2
2- 10/74 - 3/75	3.4000	2726	9268.40	12.1	13.1
3- 4/75 - 9/75	3.4744	2123	7376.15	11.3	11.9
4- 10/75 - 3/76	3.4175	2563	8759.05	11.1	12.2
5- 4/76 - 9/76	3.4566	2221	7677.11	11.0	11.6
6- 10/76 - 3/77	3.5303	1704	6015.63	9.5	10.2
7- 4/77 - 9/77	3.5436	1515	5368.55	11.3	10.9
8- 10/77 - 3/78	3.5137	1290	4532.67	7.4	7.8
9- 4/78 - 9/78	3.6618	751	2750.01	5.6	5.6
10- 10/78 - 3/79	3.7478	470	1761.47	3.6	3.5
Penbritin/ Ayerst					
1- 4/74 - 9/74	3.8864	530	2059.79	3.3	3.3
2- 10/74 - 3/75	3.6777	854	3140.76	4.1	4.1
3- 4/75 - 9/75	3.8658	713	2756.32	4.2	4.0
4- 10/75 - 3/76	3.9264	672	2638.54	3.3	3.2
5- 4/76 - 9/76	3.9402	410	1615.48	2.3	2.1
6- 10/76 - 3/77	4.0838	225	918.86	1.4	1.3
7- 4/77 - 9/77	3.9677	119	472.16	1.0	.9
8- 10/77 - 3/78	3.1627	55	173.95	.3	.3
9- 4/78 - 9/78	3.7217	44	163.75	.3	.3
10- 10/78 - 3/79	2.3668	16	37.87	.1	.1
Polycillin/ Bristol					
1- 4/74 - 9/74	3.8340	1275	4888.35	7.8	8.0
2- 10/74 - 3/75	4.7620	1314	6257.27	8.2	6.3
3- 4/75 - 9/75	4.9781	898	4470.33	6.9	5.0
4- 10/75 - 3/76	5.3724	764	4104.51	5.2	3.6
5- 4/76 - 9/76	5.3092	556	2951.92	4.2	2.9
6- 10/76 - 3/77	5.7293	406	2326.10	3.7	2.4
7- 4/77 - 9/77	5.1098	238	1216.13	2.6	1.7
8- 10/77 - 3/78	5.4396	162	881.22	1.4	1.0
9- 4/78 - 9/78	3.6176	74	267.70	.5	.5
10- 10/78 - 3/79	2.6386	37	97.63	.2	.3

Table 8-16, cont.
Cost Per Unit, Number of Prescriptions, and Percent Represented by Brands of Ampicillin, 250 MG LIQ, April 1, 974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Bottle	No. Rxs	Estimated Ingredient Cost	Percent of Ingredient Cost	Percent of Rxs
Principen/ Squibb					
1- 4/74 - 9/74	4.3936	4071	17,886.35	28.5	25.7
2- 10/74 - 3/75	4.5539	5342	24,326.93	31.8	25.6
3- 4/75 - 9/75	4.5544	4043	18,413.44	28.3	22.7
4- 10/75 - 3/76	4.6652	4508	21,030.72	26.7	21.4
5- 4/76 - 9/76	4.6764	3498	16,358.05	23.4	18.3
6- 10/76 - 3/77	4.6309	2193	10,155.56	16.0	13.1
7- 4/77 - 9/77	4.6792	1467	6,864.39	14.4	10.6
8- 10/77 - 3/78	4.8203	1080	5,205.92	8.5	6.5
9- 4/78 - 9/78	3.6266	537	1,947.48	4.0	1.1
10- 10/78 - 3/79	3.5637	298	1,061.98	2.2	2.2
SK-Ampicillin/ SKP					
1- 4/74 - 9/74	3.1308	470	1,471.48	2.3	3.0
2- 10/74 - 3/75	3.5266	982	3,463.12	4.5	4.7
3- 4/75 - 9/75	3.6045	1053	3,795.54	5.8	5.9
4- 10/75 - 3/76	3.6647	1289	4,723.80	6.0	6.1
5- 4/76 - 9/76	3.6557	1124	4,109.01	5.9	6.0
6- 10/76 - 3/77	3.0251	618	1.869.51	2.9	3.7
7- 4/77 - 9/77	3.0956	454	1,405.40	3.0	3.3
8- 10/77 - 3/78	2.5951	340	882.33	1.4	2.1
9- 4/78 - 9/78	2.3469	201	471.73	1.0	.4
10- 10/78 - 3/79	2.3225	118	274.06	.6	.9
Other Brands/ Miscellaneous					
1- 4/74 - 9/74	N/A	1526	N/A	N/A	9.6
2- 10/74 - 3/75		2539			12.3
3- 4/75 - 9/75		2339			13.1
4- 10/75 - 3/76		2036			10.0
5- 4/76 - 9/76		1505			7.9
6- 10/76 - 3/77		929			5.5
7- 4/77 - 9/77		687			5.0
8- 10/77 - 3/78		572			3.5
9- 4/78 - 9/78		404			3.0
10- 10/78 - 3/79		204			1.5
Ampicillin/ Mixcellaneous					
1- 4/74 - 9/74	3.9199	5509	21,594.73	34.4	34.7
2- 10/74 - 3/75	3.2438	5899	19,135.18	25.0	28.3
3- 4/75 - 9/75	3.2386	5521	17,880.31	27.5	31.0
4- 10/75 - 3/76	3.0315	8211	24,891.65	31.6	39.0
5- 4/76 - 9/76	3.0374	8956	27,202.95	38.9	47.0
6- 10/76 - 3/77	3.0342	10288	31,215.85	49.2	61.3
7- 4/77 - 9/77	3.0935	9049	27,993.08	59.0	65.3
8- 10/77 - 3/78	3.5115	12723	44,676.81	72.6	76.9
9- 4/78 - 9/78	3.6612	11252	41,195.82	84.1	83.3
10- 10/78 - 3/79	3.7664	11940	44,970.82	91.3	90.0

Table 8-16, cont.

Cost Per Unit, Number of Prescriptions, and Percent Represented by Brands of Ampicillin, 250 MG LIQ, April 1, 974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Bottle	No. Rxs	Estimated Ingredient Cost	Percent of	
				Ingredient Cost	Rxs
TOTALS					
1- 4/74 - 9/74	3.9619	15862	62,843.66	100.0	100.0
2- 10/74 - 3/75	3.6679	20876	76,571.08	100.0	100.0
3- 4/75 - 9/75	3.6464	17829	65,011.67	100.0	100.0
4- 10/75 - 3/76	3.7475	21046	78,869.89	100.0	100.0
5- 4/76 - 9/76	3.6631	19072	69,862.64	100.0	100.0
6- 10/76 - 3/77	3.7790	16785	63,430.52	100.0	100.0
7- 4/77 - 9/77	3.4274	13864	47,517.47	100.0	100.0
8- 10/77 - 3/78	3.7208	16541	61,545.75	100.0	100.0
9- 4/78 - 9/78	3.6273	13510	49,004.82	100.0	100.0
10- 10/78 - 3/79	3.7097	13274	49,242.56	100.0	100.0

TABLE 8-17

Projected Savings Estimates, Ampicillin, 250 MG CAP, April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	.0723	.0673
- Projected*	.0662	.0604
- Difference	(.0061)	(.0069)
Number of Units	521,810	530,064
Projected Savings (Costs)	($3,183)	($3,657)
Savings based on Rxs:		
Cost Per Rx - Actual	2.3674	2.2190
- Projected**	2.1849	2.0524
- Difference	(.1825)	(.1666)
Number of Rxs	15,925	16,084
Projected Savings (Costs)	($2,906)	($2,680)

* Based on y-intercept of .1186, slope of -.0058, and simple correlation coefficient of .977.

** Based on y-intercept of 3.3775, slope of -.1325, and simple correlation coefficient of .949.

TABLE 8-18

Projected Savings Estimates, Ampicillin, 500 MG CAP

April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	.1392	.1315
- Projected*	.1229	.1122
- Difference	(.0163)	(.0193)
Number of Units	330,678	330,038
Projected Savings (Costs)	($5,390)	($6,370)
Savings based on Rxs:		
Cost Per Rx - Actual	4.5716	4.2906
- Projected**	4.2401	4.0241
- Difference	(.3315)	(.2665)
Number of Rxs	10,072	10,116
Projected Savings (Costs)	($3,339)	($2,696)

* Based on y-intercept of .2197 , slope of -.0108 , and simple correlation coefficient of .970 .

** Based on y-intercept of 6.1843 , slope of -.2160 , and simple correlation coefficient of .925.

TABLE 8-19

Projected Savings Estimates, Ampicillin, 125 MG LIQ, April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	2.3720	2.4113
- Projected*	2.1984	2.1900
- Difference	(.1736)	(.2213)
Number of Units (Rxs)	5,855	6,030
Projected Savings (Costs)	($1,016)	($1,334)

* Based on y-intercept of 2.2741, slope of -.0084, and simple correlation coefficient of .241.

TABLE 8-20

Projected Savings Estimates, Ampicillin, 250 MG LIQ, April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	3.6273	3.7097
- Projected*	3.5637	3.5330
- Difference	(.0636)	(.1767)
Number of Units (Rxs)	13,510	13,274
Projected Savings (Costs)	($859)	($2,346)

* Based on y-intercept of 3.8398, slope of -.0307, and simple correlation coefficient of .302.

TABLE 8-21

Number of Prescriptions and Ingredient Costs for Selected Penicillins, Tablets and Capsules Only, October 1976 - March 1979

Time Period Product	Prescriptions		Ingredient Costs		Cost Per Rx	
	Number	Percent	Amount	Percent	Amount	% Change from Prior Period
Period 6:						
Ampicillin Caps	25,238	34.3%	$ 80,321.68	37.1%	$3.18	--
Pen VK	29,076	39.5	58,965.04	27.3	2.03	--
Pen G Potassium	8,952	12.1	9,735.61	4.5	1.09	--
All Other	10,415	14.1	67,222.38	31.1	6.45	--
TOTAL - TABS	73,681	100.1	216,244.71	100.0	2.93	--
Period 7:						
Ampicillin	23,773	32.8%	$ 77,714.51	35.8%	$3.27	+ 2.8%
Pen VK	30,143	41.6	58,399.49	26.9	1.94	- 4.4
Pen G Potassium	7,488	10.3	7,858.01	3.6	1.05	- 3.7
All Other	11,042	15.2	73,102.39	33.7	6.62	+ 2.6
TOTAL - TABS	72,446	100.0	217,074.40	100.0	3.00	+ 2.4
Period 8:						
Ampicillin	27,299	33.9%	$ 87,642.31	35.2%	$3.21	- 1.8%
Pen VK	34,478	42.8	70,290.65	28.3	2.04	+ 5.2
Pen G Potassium	7,535	9.4	7,665.29	3.1	1.02	- 2.9
All Other	11,242	14.0	83,134.91	33.4	7.40	+11.8
TOTAL - TABS	80,554	100.0	248,733.16	100.0	3.09	+ 3.0
Period 9:						
Ampicillin	25,997	33.5%	$ 83,746.09	34.4%	$3.22	+ 0.3%
Pen VK	34,957	45.0	64,131.29	26.4	1.83	-10.3
Pen G Potassium	6,044	7.8	6,057.05	2.5	1.00	- 2.0
All Other	10,712	13.8	89,229.05	36.7	8.33	+12.6
TOTAL - TABS	77,710	100.0	243,163.48	100.0	3.13	+ 1.3
Period 10:						
Ampicillin	26,200	33.0%	$ 79,093.68	33.3%	$3.02	- 6.2%
Pen VK	35,832	45.1	61,891.33	26.1	1.73	- 5.5
Pen G Potassium	5,896	7.4	4,572.86	1.9	.78	-22.0
All Other	11,444	14.4	91,958.47	38.7	8.04	- 3.5
TOTAL - TABS	79,372	100.0	237,516.34	100.0	2.99	- 4.5

TABLE 8-22
Number of Prescriptions and Ingredient Costs for Selected Penicillins, Liquids Only, October 1976 - March 1979

Time Period Product	Prescriptions		Ingredient Costs		Cost Per Rx	
	Number	Percent	Amount	Percent	Amount	% Change from Prior Period
Period 6:						
Ampicillin Caps	24,571	39.8	80,748.14	41.0	3.29	-
Pen VK	21,762	35.3	51,336.34	26.0	2.36	-
Pen G Potassium	2,394	3.9	6,006.64	3.0	2.51	-
All Other	12,968	21.0	59,055.25	30.0	4.55	-
TOTAL - LIQ	61,695	100.0	197,146.37	100.0	3.20	-
Period 7:						
Ampicillin Caps	20,131	35.1	60,915.07	34.1	3.03	-7.9%
Pen VK	21,387	37.3	50,465.71	28.3	2.36	0.0
Pen G Potassium	2,039	3.6	5,298.68	3.0	2.60	+3.6
All Other	13,849	24.1	61,807.28	34.6	4.46	-2.0
TOTAL - LIQ	57,406	100.0	178,486.74	100.0	3.11	-2.8
Period 8:						
Ampicillin Caps	23,996	35.3	79,112.71	35.2	3.30	+8.9%
Pen VK	22,669	33.4	60,675.08	27.0	2.68	+13.6
Pen G Potassium	1,780	2.6	4,299.80	1.9	2.42	-6.9
All Other	19,473	28.7	80,646.28	35.9	4.14	-7.2
TOTAL - LIQ	67,918	100.0	224,733.87	100.0	3.31	+6.4
Period 9:						
Ampicillin Caps	19,367	31.2	62,968.50	30.1	3.25	-1.5%
Pen VK	21,675	34.9	55,419.72	26.5	2.56	-4.5
Pen G Potassium	1,286	2.1	3,207.99	1.5	2.49	+2.9
All Other	19,826	31.9	87,856.55	41.9	4.43	+7.0
TOTAL - LIQ	62,154	100.0	209,452.76	100.0	3.37	+1.8
Period 10:						
Ampicillin Caps	19,308	29.0	63,887.68	27.6	3.31	+1.8%
Pen VK	21,743	32.7	58,602.47	25.3	2.70	+5.5
Pen G Potassium	1,113	1.7	2,502.97	1.1	2.25	-9.6
All Other	24,310	36.6	106,203.45	45.9	4.37	-1.4
TOTAL - LIQ	66,474	100.0	231,196.57	100.0	3.48	+3.3

8.3.4.4 Penicillin VK

Four dosage forms of Penicillin VK were subjected to MAC price limitations:

Dosage Form	MAC Price
250 MG	$.0535/CAP
500 MG	.1025/CAP
125 MG LIQ	.0120/cc
250 MG LIQ	.0160/cc

Tables 8-23, 8-24, 8-25, and 8-26 indicate reimbursement experience with costs per unit, ingredient cost per prescription, and percentages of ingredient costs, units, and prescriptions for the various manufacturers of penicillin VK. The tables for liquids again use the per bottle costs to avoid the problem of inconsistent unit measures.

Description of Trends. The experience with penicillin VK is analogous to that with ampicillin, except penetration by the miscellaneous manufacturers prior to MAC was not so complete in the penicillin VK market. By the eighth study period, miscellaneous penicillin VK manufacturers accounted for 62.4% of the 250 MG TAB prescriptions, 56.1% of the 500 MG TAB prescriptons, 50.1% of the 125 MG LIQ prescriptions, and 53.9% of the 250 MG LIQ prescriptons. The two largest selling brands of the product, V-Cillin-K (Lilly) and Pen-Vee K (Wyeth), maintained the same per-unit cost level during the first eight study periods despite a steadily decreasing market share.

A negative impact or loss is again indicated due to the state's having initially set MAC price levels only on the products of miscellaneous manufacturers. The cost per unit for tablets increased by nearly 100% between periods 7 and 8, and the per-unit costs for liquids increased by 50%.

Savings Projections. The savings projected from the four dosage forms are estimated in Tables 8-27, 8-28, 8-29, and 8-30. Tablets generally indicate a small savings, while liquids indicate additional costs. The overall projected effect in Period 9 was a reimbursement loss of $886 using per-unit projections and a cost savings of $1,092 using per-prescription projections. The estimates for Period 10 were, respectively, an additional cost of $1,961 and a savings of $161.

The disappointing cost-savings experience for penicillin VK occurred for the same reasons mentioned for ampicillin: (1) a downward trend in the per-unit prices prior to MAC implementation and (2) insertion of higher MAC prices in the Price File for miscellaneous manufacturers. If the ratio between percentage of ingredient cost and percentage prescriptions had been constant between Period 7 and Period 8, the state's total reimbursement would have been reduced by the following amounts: $10,479 for 250 MG TABS, $1,563 for 500 MG TABS, $1,339 for 125 MG LIQ, and $6,575 for 250 MG LIQ. The total estimated additional cost of reimbursement for miscellaneous penicillin VK is $19,956 and largely explains why the cost savings being achieved overall on penicillin VK is so small, if not negative.

Therapeutic Category. -- As already noted, penicillin VK also belongs to the penicillin therapeutic category. The claims experience during the past five periods was shown in Table 8-21 for tablets and Table 8-22 for liquids. While the number of penicillin VK tablet prescriptions has increased relative to the entire therapeutic category, the percentage of ingredient cost reimbursement has remained fairly constant due to progressive price reductions over the study period.

TABLE 8-23

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Penicillin VK, 250 MG TABS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of Ingred. Cost	Percent of Units	Percent of Rxs
Ledercillin VK/ Lederle					
1- 4/74 - 9/74	.0868	2.7392	6.1	5.5	5.0
2- 10/74 - 3/75	.0840	2.6272	7.4	6.8	6.4
3- 4/75 - 9/75	.0844	2.6610	7.7	6.8	6.4
4- 10/75 - 3/76	.0846	2.7704	7.1	5.9	5.5
5- 4/76 - 9/76	.0861	2.8300	7.2	5.5	5.2
6- 10/76 - 3/77	.0882	2.8157	5.9	4.1	4.0
7- 4/77 - 9/77	.0869	2.7912	5.3	3.5	3.4
8- 10/77 - 3/78	.0717	2.3646	3.4	2.9	2.8
9- 4/78 - 9/78	.0567	1.8059	1.7	1.6	1.6
10- 10/78 - 3/79	.0510	1.7165	1.1	1.1	1.0
Pen-Vee K/Wyeth					
1- 4/74 - 9/74	.1036	3.0497	32.3	24.4	24.2
2- 10/74 - 3/75	.1031	3.0198	31.4	23.6	23.5
3- 4/75 - 9/75	.1032	3.0657	31.9	23.2	23.1
4- 10/75 - 3/76	.1032	3.1546	33.2	22.6	22.4
5- 4/76 - 9/76	.1030	3.1779	32.5	20.9	21.1
6- 10/76 - 3/77	.1029	3.2157	31.4	18.6	18.3
7- 4/77 - 9/77	.1027	3.2112	29.7	16.7	16.6
8- 10/77 - 3/78	.1006	3.2272	20.0	12.0	11.8
9- 4/78 - 9/78	.0771	2.4885	9.6	6.8	6.7
10- 10/78 - 3/79	.0515	1.6912	4.8	4.7	4.6
Pfizerpen VK/ Pfipharmecs					
1- 4/74 - 9/74	.0805	2.4885	3.4	3.3	3.1
2- 10/74 - 3/75	.0816	2.5880	3.6	3.4	3.2
3- 4/75 - 9/75	.0727	2.2479	4.3	4.4	4.2
4- 10/75 - 3/76	.0538	1.6455	2.9	3.8	3.8
5- 4/76 - 9/76	.0609	1.9312	3.0	3.3	3.2
6- 10/76 - 3/77	.0612	1.9716	2.5	2.5	2.4
7- 4/77 - 9/77	.0632	2.0897	2.1	1.9	1.8
8- 10/77 - 3/78	.0572	1.9407	1.6	1.7	1.6
9- 4/78 - 9/78	.0510	1.7378	.8	1.0	.8
10- 10/78 - 3/79	.0412	1.3221	.5	.6	.6
SK-Penicillin VK/ SKF					
1- 4/74 - 9/74	.0602	1.9429	2.1	2.8	2.5
2- 10/74 - 3/75	.0595	1.8472	2.5	3.2	3.1
3- 4/75 - 9/75	.0594	1.9148	3.1	3.9	3.6
4- 10/75 - 3/76	.0593	1.8396	3.4	4.1	4.0
5- 4/76 - 9/76	.0583	1.8589	3.6	4.1	4.0
6- 10/76 - 3/77	.0535	1.6614	2.9	3.3	3.3
7- 4/77 - 9/77	.0530	1.7048	2.5	2.7	2.6
8- 10/77 - 3/78	.0442	1.4243	1.4	1.9	1.9
9- 4/78 - 9/78	.0363	1.1495	.8	1.2	1.2
10- 10/78 - 3/79	.0348	1.1111	.5	.7	.7

TABLE 8-23, cont.

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Penicillin VK, 250 MG TABS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of		
			Ingred. Cost	Units	Rxs
V-Cillin K/Lilly					
1- 4/74 - 9/74	.0885	2.3811	32.0	28.3	30.7
2- 10/74 - 3/75	.0886	2.4164	34.5	30.1	32.3
3- 4/75 - 9/75	.0893	2.4441	32.6	27.4	29.7
4- 10/75 - 3/76	.0897	2.4886	30.2	23.7	25.9
5- 4/76 - 9/76	.0896	2.5214	28.8	21.3	23.5
6- 10/76 - 3/77	.0898	2.5200	28.3	19.3	21.1
7- 4/77 - 9/77	.0899	2.4812	26.7	17.1	19.3
8- 10/77 - 3/78	.0893	2.5047	18.9	12.8	14.3
9- 4/78 - 9/78	.0715	2.0368	10.3	7.8	8.7
10- 10/78 - 3/79	.0523	1.5329	3.9	3.7	4.1
Other Brands, Misc	N/A	N/A			
1- 4/74 - 9/74			14.6	13.9	14.8
2- 10/74 - 3/75			14.4	13.5	13.6
3- 4/75 - 9/75			13.1	11.9	12.1
4- 10/75 - 3/76			12.9	10.8	11.2
5- 4/76 - 9/76			11.8	9.6	9.8
6- 10/76 - 3/77			11.6	8.8	9.2
7- 4/77 - 9/77			10.1	7.5	7.7
8- 10/77 - 3/78			6.9	5.0	5.2
9- 4/78 - 9/78			4.0	3.3	3.3
10- 10/78 - 3/79			2.1	2.1	2.1
Penicillin VK/Misc					
1- 4/74 - 9/74	.0341	1.0975	9.5	21.8	19.7
2- 10/74 - 3/75	.0248	.7844	6.2	19.4	17.9
3- 4/75 - 9/75	.0246	.7833	7.3	22.4	20.9
4- 10/75 - 3/76	.0247	.8018	10.3	29.1	27.2
5- 4/76 - 9/76	.0247	.8144	13.1	35.3	33.2
6- 10/76 - 3/77	.0245	.7837	17.4	43.4	41.7
7- 4/77 - 9/77	.0269	.8727	23.6	50.6	48.6
8- 10/77 - 3/78	.0453	1.4550	47.8	63.7	62.4
9- 4/78 - 9/78	.0505	1.6108	72.8	78.3	77.7
10- 10/78 - 3/79	.0497	1.6058	87.1	87.1	86.9
Totals					
1- 4/74 - 9/74	.0784	2.2841	100.0	100.0	100.0
2- 10/74 - 3/75	.0775	2.2651	100.0	100.0	100.0
3- 4/75 - 9/75	.0751	2.2230	100.0	100.0	100.0
4- 10/75 - 3/76	.0702	2.1301	100.0	100.0	100.0
5- 4/76 - 9/76	.0663	2.0602	100.0	100.0	100.0
6- 10/76 - 3/77	.0611	1.8806	100.0	100.0	100.0
7- 4/77 - 9/77	.0578	1.8000	100.0	100.0	100.0
8- 10/77 - 3/78	.0603	1.9008	100.0	100.0	100.0
9- 4/78 - 9/78	.0543	1.7184	100.0	100.0	100.0
10- 10/78 - 3/79	.0497	1.6020	100.0	100.0	100.0

TABLE 8-24

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Penicillin VK, 500 MG TABS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of Ingred. Cost	Percent of Units	Percent of Rxs
Ledercillin VK/ Lederle					
1- 4/74 - 9/74	.1518	4.6443	3.6	3.7	3.1
2- 10/74 - 3/75	.1493	4.0182	3.3	3.4	3.3
3- 4/75 - 9/75	.1504	4.3553	4.3	4.4	4.1
4- 10/75 - 3/76	.1522	4.6239	4.1	4.0	3.5
5- 4/76 - 9/76	.1526	4.3391	4.1	3.7	3.7
6- 10/76 - 3/77	.1567	4.6003	4.6	3.8	3.6
7- 4/77 - 9/77	.1484	5.4709	5.2	4.2	3.3
8- 10/77 - 3/78	.1257	4.4490	2.5	2.4	2.0
9- 4/78 - 9/78	.0940	3.6020	1.1	1.2	.9
10- 10/78 - 3/79	.0948	3.7464	1.0	1.0	.7
Pen-Vee K/Wyeth					
1- 4/74 - 9/74	.1922	5.2432	24.2	19.6	18.2
2- 10/74 - 3/75	.1904	5.1652	25.0	20.4	19.4
3- 4/75 - 9/75	.1925	5.3072	26.5	21.2	20.4
4- 10/75 - 3/76	.1940	5.4354	28.2	21.5	20.8
5- 4/76 - 9/76	.1944	5.7819	30.9	22.1	21.0
6- 10/76 - 3/77	.1931	5.7883	28.5	18.9	17.7
7- 4/77 - 9/77	.1935	5.3368	30.2	18.7	19.8
8- 10/77 - 3/78	.1924	5.4200	19.3	12.1	12.4
9- 4/78 - 9/78	.1416	3.9701	9.4	7.0	7.1
10- 10/78 - 3/79	.1011	2.9315	5.8	5.7	5.6
Pfizerpen VK/ Pfipharmecs					
1- 4/74 - 9/74	.1314	4.5304	3.1	3.7	2.7
2- 10/74 - 3/75	.1345	3.7980	2.0	2.3	2.1
3- 4/75 - 9/75	.1275	3.4620	1.5	1.8	1.8
4- 10/75 - 3/76	.0924	2.9950	1.5	2.3	2.0
5- 4/76 - 9/76	.1228	4.1062	3.3	3.7	3.2
6- 10/76 - 3/77	.1232	4.1060	2.9	3.0	2.5
7- 4/77 - 9/77	.1260	3.5123	3.0	2.9	3.0
8- 10/77 - 3/78	.1253	3.1771	1.6	1.6	1.8
9- 4/78 - 9/78	.1080	3.2009	.8	.8	.8
10- 10/78 - 3/79	.0960	2.7832	1.0	1.1	1.1
SK-Penicillin VK/ SKF					
1- 4/74 - 9/74	.1135	3.0835	1.1	1.5	1.4
2- 10/74 - 3/75	.1104	2.9037	1.2	1.7	1.7
3- 4/75 - 9/75	.1099	3.0899	1.5	2.0	1.9
4- 10/75 - 3/76	.1103	3.2705	2.6	3.4	3.1
5- 4/76 - 9/76	.1065	2.9571	2.1	2.7	2.8
6- 10/76 - 3/77	.1025	2.8196	1.5	1.9	1.9
7- 4/77 - 9/77	.1022	2.7922	1.8	2.1	2.2
8- 10/77 - 3/78	.0811	2.2755	1.3	2.0	2.0
9- 4/78 - 9/78	.0660	1.5574	1.2	2.0	2.4
10- 10/78 - 3/79	.0635	1.5511	.8	1.2	1.4

TABLE 8-24, cont.

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Penicillin VK, 500 MG TABS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of		
			Ingred. Cost	Units	Rxs
V-Cillin K/Lilly					
1- 4/74 - 9/74	.1675	3.8900	48.9	45.5	49.5
2- 10/74 - 3/75	.1683	4.1993	50.3	46.5	48.0
3- 4/75 - 9/75	.1685	4.3443	48.3	44.1	45.5
4- 10/75 - 3/76	.1704	4.3460	46.9	40.6	43.2
5- 4/76 - 9/76	.1711	4.5883	40.5	32.9	34.7
6- 10/76 - 3/77	.1716	4.5619	39.6	29.6	31.3
7- 4/77 - 9/77	.1710	4.5507	34.1	23.8	26.1
8- 10/77 - 3/78	.1709	4.5635	27.3	19.3	20.9
9- 4/78 - 9/78	.1349	3.6776	14.2	11.2	11.6
10- 10/78 - 3/79	.1016	2.9263	6.4	6.2	6.2
Other Brands/Misc.	N/A	N/A			
1- 4/74 - 9/74			16.5	17.6	17.7
2- 10/74 - 3/75			15.1	15.6	15.8
3- 4/75 - 9/75			13.9	13.4	14.0
4- 10/75 - 3/76			11.2	10.9	10.9
5- 4/76 - 9/76			10.6	9.9	10.5
6- 10/76 - 3/77			10.3	8.8	10.2
7- 4/77 - 9/77			9.5	7.6	7.6
8- 10/77 - 3/78			6.0	4.8	4.8
9- 4/78 - 9/78			3.8	3.5	3.9
10- 10/78 - 3/79			2.2	2.2	2.6
Penicillin VK/ Misc.					
1- 4/74 - 9/74	.0479	1.3795	2.6	8.4	7.4
2- 10/74 - 3/75	.0471	1.2657	3.1	10.1	9.7
3- 4/75 - 9/75	.0474	1.3441	4.0	13.1	12.3
4- 10/75 - 3/76	.0474	1.3430	5.5	17.3	16.5
5- 4/76 - 9/76	.0474	1.3892	8.5	25.0	24.1
6- 10/76 - 3/77	.0476	1.3880	12.6	34.0	32.8
7- 4/77 - 9/77	.0476	1.4873	16.2	40.7	38.0
8- 10/77 - 3/78	.0878	2.6186	42.0	57.8	56.1
9- 4/78 - 9/78	.0994	2.8497	69.5	74.3	73.3
10- 10/78 - 3/79	.0989	2.8683	82.8	82.6	82.4
Totals					
1- 4/74 - 9/74	.1558	3.9355	100.0	100.0	100.0
2- 10/74 - 3/75	.1554	4.0074	100.0	100.0	100.0
3- 4/75 - 9/75	.1536	4.0918	100.0	100.0	100.0
4- 10/75 - 3/76	.1477	4.0035	100.0	100.0	100.0
5- 4/76 - 9/76	.1389	3.9299	100.0	100.0	100.0
6- 10/76 - 3/77	.1283	3.6081	100.0	100.0	100.0
7- 4/77 - 9/77	.1196	3.4908	100.0	100.0	100.0
8- 10/77 - 3/78	.1210	3.4991	100.0	100.0	100.0
9- 4/78 - 9/78	.1062	3.0067	100.0	100.0	100.0
10- 10/78 - 3/79	.0986	2.8566	100.0	100.0	100.0

TABLE 8-25
Penicillin VK 125 MG LIQ

Product/ Manufacturer Time Period	Cost/ Bottle	No. Rxs	Estimated Ingredient Cost	Percent of	
				Ingredient Cost	Rxs
Ledercillin VK/ Lederle					
1- 4/74 - 9/74	1.4875	200	297.5	3.6	3.9
2- 10/74 - 3/75	1.7699	244	431.86	4.0	4.0
3- 4/75 - 9/75	1.8934	290	549.09	5.1	5.0
4- 10/75 - 3/76	1.9104	242	462.32	4.4	4.1
5- 4/76 - 9/76	2.0397	259	528.28	4.8	4.2
6- 10/76 - 3/77	2.0485	153	313.42	3.4	2.9
7- 4/77 - 9/77	2.0228	180	364.10	4.3	3.6
8- 10/77 - 3/78	2.2774	167	380.33	4.0	3.3
9- 4/78 - 9/78	1.8379	125	229.74	2.6	2.6
10- 10/78 - 3/79	1.8332	99	181.49	2.1	2.1
Pen-Vee K/ Wyeth					
1- 4/74 - 9/74	2.0986	1046	2195.14	26.5	20.6
2- 10/74 - 3/75	2.1001	1296	2721.73	25.3	21.3
3- 4/75 - 9/75	2.0571	1253	2577.55	24.1	21.4
4- 10/75 - 3/76	2.0722	1262	2615.12	25.0	21.7
5- 4/76 - 9/76	2.1116	1344	2837.99	25.8	21.8
6- 10/76 - 3/77	2.1498	1110	2386.28	25.8	20.8
7- 4/77 - 9/77	2.1051	905	1905.12	22.6	18.1
8- 10/77 - 3/78	2.1164	741	1568.25	16.5	14.5
9- 4/78 - 9/78	1.9875	435	864.56	9.8	8.9
10- 10/78 - 3/79	1.7464	301	525.67	6.0	6.5
Pfizerpen VK/ Pfipharmecs					
1- 4/74 - 9/74	1.7402	171	297.57	3.6	3.4
2- 10/74 - 3/75	1.8202	171	311.25	2.9	2.8
3- 4/75 - 9/75	1.6038	189	303.12	2.8	3.2
4- 10/75 - 3/76	1.3911	183	254.57	2.4	3.1
5- 4/76 - 9/76	1.6823	285	479.46	4.4	4.6
6- 10/76 - 3/77	1.6368	224	366.64	4.0	4.2
7- 4/77 - 9/77	1.5548	202	314.07	3.7	4.0
8- 10/77 - 3/78	1.6932	158	267.53	2.8	3.1
9- 4/78 - 9/78	1.5413	66	101.73	1.1	1.3
10- 10/78 - 3/79	1.5497	60	92.98	1.1	1.3
SK-Penicillin VK/ SKF					
1- 4/74 - 9/74	1.2878	90	115.90	1.4	1.8
2- 10/74 - 3/75	1.3216	111	146.70	1.4	1.8
3- 4/75 - 9/75	1.5816	191	302.09	2.8	3.2
4- 10/75 - 3/76	1.6226	212	343.99	3.3	3.6
5- 4/76 - 9/76	1.6548	284	469.96	4.3	4.6
6- 10/76 - 3/77	1.5866	250	396.65	4.3	4.7
7- 4/77 - 9/77	1.6328	202	329.83	3.9	4.0
8- 10/77 - 3/78	1.2505	154	192.58	2.0	3.0
9- 4/78 - 9/78	1.2561	113	141.94	1.6	2.3
10- 10/78 - 3/79	1.2589	38	47.84	.5	.8

TABLE 8-25, cont.

Penicillin VK 125 MG LIQ, cont.

Product/ Manufacturer Time Period	Cost/ Bottle	No. Rxs	Estimated Ingredient Cost	Percent of	
				Ingredient Cost	Rxs
V-Cillin-K/ Lilly					
1- 4/74 - 9/74	1.5542	2279	3,542.02	42.7	44.9
2- 10/74 - 3/75	1.7576	2804	4,928.31	45.8	46.0
3- 4/75 - 9/75	1.7984	2599	4,674.04	43.7	44.4
4- 10/75 - 3/76	1.8290	2274	4,159.15	39.8	39.1
5- 4/76 - 9/76	1.8367	2082	3,824.01	34.8	33.8
6- 10/76 - 3/77	1.8884	1631	3,079.98	33.3	30.6
7- 4/77 - 9/77	1.8055	1408	2,542.14	30.1	28.1
8- 10/77 - 3/78	1.7188	1043	1,792.71	18.8	20.3
9- 4/78 - 9/78	1.5358	566	869.26	9.8	11.6
10- 10/78 - 3/79	1.8235	255	464.99	5.3	5.5
Other Brands/ Misc.	N/A		N/A	N/A	
1- 4/74 - 9/74		906			17.8
2- 10/74 - 3/75		1100			18.0
3- 4/75 - 9/75		873			14.9
4- 10/75 - 3/76		898			15.5
5- 4/76 - 9/76		802			13.0
6- 10/76 - 3/77		468			8.8
7- 4/77 - 9/77		425			8.5
8- 10/77 - 3/78		294			5.7
9- 4/78 - 9/78		152			3.1
10- 10/78 - 3/79		119			2.6
Penicillin VK/ Misc.					
1- 4/74 - 9/74	1.0920	387	422.60	5.1	7.6
2- 10/74 - 3/75	1.1150	369	411.44	3.8	6.1
3- 4/75 - 9/75	1.1148	457	509.46	4.8	7.8
4- 10/75 - 3/76	1.1258	741	834.22	8.0	12.7
5- 4/76 - 9/76	1.1375	1104	1,255.80	11.4	17.9
6- 10/76 - 3/77	1.1308	1494	1,689.42	18.3	28.0
7- 4/77 - 9/77	1.2694	1684	2,137.67	25.3	33.6
8- 10/77 - 3/78	1.9160	2571	4,926.04	51.8	50.1
9- 4/78 - 9/78	1.8769	3441	6,458.41	73.0	70.2
10- 10/78 - 3/79	1.9240	3771	7,255.40	83.3	81.2
Totals					
1- 4/74 - 9/74	1.6314	5079	8,285.88	100	100
2- 10/74 - 3/75	1.7655	6095	10,760.72	100	100
3- 4/75 - 9/75	1.8263	5852	10,687.51	100	100
4- 10/75 - 3/76	1.7987	5812	10,454.04	100	100
5- 4/76 - 9/76	1.7838	6160	10,988.21	100	100
6- 10/76 - 3/77	1.7359	5330	9,252.35	100	100
7- 4/77 - 9/77	1.6857	5006	8,438.61	100	100
8- 10/77 - 3/78	1.8555	5128	9,515.00	100	100
9- 4/78 - 9/78	1.8062	4898	8,846.77	100	100
10- 10/78 - 3/79	1.8759	4643	8.709.80	100	100

TABLE 8-26
Penicillin VK 250 MG LIQ

Product/ Manufacturer Time Period	Cost/ Bottle	No. Rxs	Estimated Ingredient Cost	Percent of	
				Ingredient Cost	Rxs
Ledercillin VK/ Lederle					
1- 4/74 - 9/74	3.0053	998	2,999.29	8.3	7.3
2- 10/74 - 3/75	2.9849	1528	4,560.93	9.5	8.9
3- 4/75 - 9/75	3.0010	1572	4,717.57	9.9	9.4
4- 10/75 - 3/76	3.0750	1836	5,645.70	11.2	10.2
5- 4/76 - 9/76	3.1847	1635	5,206.98	9.4	8.0
6- 10/76 - 3/77	3.2790	1272	4,170.89	9.9	7.7
7- 4/77 - 9/77	3.4067	1087	3,703.08	8.8	6.6
8- 10/77 - 3/78	2.9549	988	2,919.44	5.7	5.6
9- 4/78 - 9/78	3.0453	687	2,092.12	4.5	4.1
10- 10/78 - 3/79	2.7824	451	1,254.86	2.5	2.6
Pen-Vee K/ Wyeth					
1- 4/74 - 9/74	3.0607	2729	8,352.65	23.1	19.9
2- 10/74 - 3/75	3.1259	3420	10,690.58	22.3	19.9
3- 4/75 - 9/75	3.1326	3399	10.647.71	22.2	20.4
4- 10/75 - 3/76	3.1923	3743	11,948.78	23.7	20.7
5- 4/76 - 9/76	3.1439	4309	13,547.07	24.5	21.0
6- 10/76 - 3/77	3.1683	3293	10,433.21	24.8	20.0
7- 4/77 - 9/77	3.1487	3032	9,546.86	22.7	18.5
8- 10/77 - 3/78	3.1291	2457	7,688.20	15.0	14.0
9- 4/78 - 9/78	2.7687	1504	4,164.12	8.9	9.0
10- 10/78 - 3/79	3.1896	1141	3,639.33	7.3	6.7
Pfizerpen VK/ Pfipharmecs					
1- 4/74 - 9/74	2.7424	491	1,346.52	3.7	3.6
2- 10/74 - 3/75	2.7994	856	2,396.29	5.0	5.0
3- 4/75 - 9/75	2.6163	837	2,189.84	4.6	5.0
4- 10/75 - 3/76	2.3055	771	1,777.54	3.5	4.3
5- 4/76 - 9/76	2.5284	904	2,285.67	4.1	4.4
6- 10/76 - 3/77	2.4845	548	1,361.51	3.2	3.3
7- 4/77 - 9/77	2.4388	495	1,207.21	2.9	3.0
8- 10/77 - 3/78	2.6616	374	995.44	1.9	2.1
9- 4/78 - 9/78	2.3530	281	661.19	1.4	1.7
10- 10/78 - 3/79	2.5987	163	423.59	.8	1.0
SK-Penicillin VK/ SKF					
1- 4/74 - 9/74	2.1455	272	583.58	1.6	2.0
2- 10/74 - 3/75	2.2099	406	897.22	1.9	2.4
3- 4/75 - 9/75	2.4934	579	1,443.68	3.0	3.5
4- 10/75 - 3/76	2.6023	698	1,816.41	3.6	3.9
5- 4/76 - 9/76	2.5369	888	2,252.77	4.1	4.3
6- 10/76 - 3/77	2.2568	533	1,202.87	2.9	3.2
7- 4/77 - 9/77	2.1614	491	1,061.25	2.5	3.0
8- 10/77 - 3/78	1.9479	405	788.90	1.5	2.3
9- 4/78 - 9/78	1.8073	269	486.16	1.0	1.6
10- 10/78 - 3/79	1.8058	152	274.48	.6	.9

TABLE 8-26, cont.
Penicillin VK 250 MG LIQ

Product/ Manufacturer Time Period	Cost/ Bottle	No. Rxs	Estimated Ingredient Cost	Percent of	
				Ingredient Cost	Rxs
V-Cillin-K/ Lilly					
1- 4/74 - 9/74	2.5853	4286	11,080.60	30.6	31.2
2- 10/74 - 3/75	2.9079	5411	15,734.65	32.8	31.5
3- 4/75 - 9/75	3.0569	5110	15,620.76	32.6	30.7
4- 10/75 - 3/76	3.0196	4755	14,358.20	28.5	26.3
5- 4/76 - 9/76	3.0086	5020	15.103.17	27.3	24.5
6- 10/76 - 3/77	2.8804	3519	10,136.13	24.1	21.4
7- 4/77 - 9/77	2.9699	3426	10,174.88	24.2	20.9
8- 10/77 - 3/78	2.9506	2869	8,465.27	16.5	16.4
9- 4/78 - 9/78	2.8041	1667	4,674.43	10.0	9.9
10- 10/78 - 3/79	2.7999	1058	2,962.29	5.9	6.2
Other Brands/ Misc.	N/A				
1- 4/74 - 9/74		3676			26.8
2- 10/74 - 3/75		4121			24.0
3- 4/75 - 9/75		3410			20.5
4- 10/75 - 3/76		3248			18.0
5- 4/76 - 9/76		3135			15.3
6- 10/76 - 3/77		1949			11.9
7- 4/77 - 9/77		1423			8.7
8- 10/77 - 3/78		986			5.6
9- 4/78 - 9/78		700			4.2
10- 10/78 - 3/79		436			2.5
Penicillin VK/ Misc.					
1- 4/74 - 9/74	1.6180	1265	2,046.77	5.7	9.2
2- 10/74 - 3/75	1.6059	1437	2,307.68	4.8	8.4
3- 4/75 - 9/75	1.6211	1747	2,832.06	5.9	10.5
4- 10/75 - 3/76	1.6147	2996	4,837.64	10.0	16.6
5- 4/76 - 9/76	1.6205	4637	7,514.26	13.6	22.6
6- 10/76 - 3/77	1.6152	5318	8,589.63	20.4	32.4
7- 4/77 - 9/77	1.8044	6427	11,596.88	27.6	39.2
8- 10/77 - 3/78	2.7472	9462	25,994.01	50.8	53.9
9- 4/78 - 9/78	2.7665	11669	32,282.29	69.3	69.6
10- 10/78 - 3/79	2.8998	13699	39,724.36	79.6	80.1
Totals					
1- 4/74 - 9/74	2.6396	13717	36,207.39		
2- 10/74 - 3/75	2.7918	17179	47,960.33		
3- 4/75 - 9/75	2.8743	16654	47,868.59		
4- 10/75 - 3/76	2.7940	18047	50,423.32		
5- 4/76 - 9/76	2.6932	20528	55,286.01		
6- 10/76 - 3/77	2.5611	16432	42,084.00		
7- 4/77 - 9/77	2.5656	16381	42,027.09		
8- 10/77 - 3/78	2.9166	17541	51,160.08		
9- 4/78 - 9/78	2.7760	16777	46,572.95		
10- 10/78 - 3/79	2.9177	17100	49,892.67		

TABLE 8-27

Projected Savings Estimates, Penicillin VK, 250 MG TABS,

April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	.0543	.0497
- Projected*	.0538	.0506
- Difference	(.0005)	.0009
Number of Units	1,005,722	1,039,051
Projected Savings (Costs)	($503)	$935
Savings based on Rxs:		
Cost Per Rx - Actual	1.7184	1.6020
- Projected**	1.7409	1.6682
- Difference	.0225	.0662
Number of Rxs	31,804	32,254
Projected Savings (Costs)	$716	$2,135

* Based on y-intercept of .0829, slope of -.0032, and simple correlation coefficient of .968.

** Based on y-intercept of 2.3951, slope of -.0727, and simple correlation coefficient of .945.

TABLE 8-28

Projected Savings Estimates, Penicillin VK, 500 MG TABS, April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	.1062	.0986
- Projected*	.1129	.1068
- Difference	.0067	.0082
Number of Units	89,229	103,614
Projected Savings (Costs)	$598	$850
Savings based on Rxs:		
Cost Per Rx - Actual	3.0067	2.8566
- Projected**	3.4371	3.3518
- Difference	.4304	.4952
Number of Rxs	3,153	3,578
Projected Savings (Costs)	$1,357	$1,772

* Based on y-intercept of .1672 , slope of -.0060 , and simple correlation coefficient of .965.

** Based on y-intercept of 4.2045 , slope of -.0853 , and simple correlation coefficient of .848.

TABLE 8-29

Projected Savings Estimates, Penicillin VK, 125 MG LIQ,

April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	1.8062	1.8759
- Projected*	1.8077	1.8182
- Difference	.0015	(.0577)
Number of Units (Rxs)	4,898	4,643
Projected Savings (Costs)	$7	($268)

TABLE 8-30

Projected Savings Estimates, Penicillin VK, 250 MG LIQ,

April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	2.7760	2.9177
- Projected**	2.7171	2.7143
- Difference	(.0589)	(.2034)
Number of Units (Rxs)	16,777	17,100
Projected Savings (Costs)	($988)	($3,478)

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* Based on y-intercept of 1.7130, slope of .0105, and simple correlation coefficient of .349.

* Based on y-intercept of 2.7420, slope of -.0028, and simple correlation coefficient of .050.

8.3.4.5 Tetracycline HCl

Two dosage forms of tetracycline were subjected to MAC price limitations:

Dosage Form	MAC Price
250mg	$.0250/CAP
500mg	.0465/CAP

Tables 8-31 and 8-32 indicate the reimbursement experience with costs per unit, ingredient cost per prescription and percentages of ingredient cost, units, and prescriptions for the by manufacturer of tetracycline.

Description of Trends.-- Miscellaneous manufacturers of Tetracycline were the largest supplier category prior to implementation of the MAC limitations. By the eighth study period, the miscellaneous category had accounted for 77.8 percent of the 250mg prescriptions and 74.4 percent of the 500mg prescriptions. The largest selling name brands, Achromycin V (Lederle) and Sumycin (Squibb),were experiencing substantial declines in market share prior to MAC implementation . Bristol's Tetrex, a tetracycline phosphate complex, was also subjected to the MAC price limitation on tetracycline in Massachusetts, even though it is not properly a tetracycline HCl. However, there were fewer than 300 Tetrex prescriptions in Period 9, so inclusion of this product has had minimal impact.

Given the large proporation of tetracycline prescriptions dispensed using the products of miscellaneous manufacturers, the state's substitution of the higher MAC price limits on resulted in a net loss due to the program. Per-unit costs increased substantially between Periods 8 and 9.

Saving Projections. The savings projections shown in Tables 8-33 and 8-34 likewise correspond to net increases in reimbursment cost, rather than an actual cost savings. The total additional cost estimated using the per-unit projections is $4,792 for Period 9 and $6,039 for Period 10, while the additional costs using per-prescription projections is $3,362 for Period 9 and $2,374 for Period 10.

The cost increases likewise resulted because of: (1) falling unit prices prior to MAC implementation and (2) adoption of higher MAC prices for miscellaneous manufacturers. Although the per-unit costs remained the same or decreased somewhat for Periods 9 and 10, the projected trend implied an even sharper downward trend. If the ratio between percentage ingredient cost and percentage prescriptions had remained constant between Periods 8 and 9, the state's total reimbursement would have been reduced by $2,609 for 250mg and $1,417 for 500mg. The total estimated additional cost of reimbursement for miscellaneous manufacturer's tetracycline is $4,026,and such increased reimbursement is a major reason for the projected additional overall costs.

Therapeutic Category... Tetracycline HCl belongs to the therapeutic category of broad and medium spectrum antibiotics. The three largest selling products in this category (tetracycline HCl, erythromycin, and cephalexin) account for nearly 75 percent of the prescriptions and more than 55 percent of the reimbursement. The claims experience for these three products is shown in Table 8-35. Tetracycline HCl's share of this category has been steadily decreasing, while cephalexin and erythromycin have experienced increases. Given that tetracycline's cost per prescription has decreased ($1.14 to $1.10), whereas the entire category's cost has increased ($4.11 to $4.76), any decrease in in tetracycline's price cannot be attributed to a general reduction in the therapeutic category.[1]

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[1] The sharp decline in the price of erythromycin during Period 10 no doubt reflects the MAC price limitation implemented in January 1979.

TABLE 8-31

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Tetracycline HCL, 250 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of		
			Ingred. Cost	Units	Rxs
Achromycin V/ Lederle					
1- 4/74 - 9/74	.0472	1.4410	20.9	15.9	17.9
2- 10/74 - 3/75	.0458	1.4566	21.8	16.5	18.8
3- 4/75 - 9/75	.0455	1.5664	21.5	15.4	17.5
4- 10/75 - 3/76	.0455	1.5456	20.8	13.5	15.5
5- 4/76 - 9/76	.0452	1.5924	18.3	11.1	13.1
6- 10/76 - 3/77	.0449	1.6673	16.5	8.9	10.3
7- 4/77 - 9/77	.0449	1.8128	15.1	7.9	8.7
8- 10/77 - 3/78	.0446	1.6541	12.4	6.4	7.6
9- 4/78 - 9/78	.0356	1.5058	7.6	5.0	5.5
10- 10/78 - 3/79	.0228	1.1133	3.0	2.8	2.6
Panmycin/Upjohn					
1- 4/74 - 9/74	.0470	1.8160	3.9	3.0	2.6
2- 10/74 - 3/75	.0457	1.7822	4.0	3.0	2.8
3- 4/75 - 9/75	.0423	1.6991	4.0	3.1	3.0
4- 10/75 - 3/76	.0425	1.6867	7.0	4.9	4.8
5- 4/76 - 9/76	.0433	1.8911	8.6	5.4	5.1
6- 10/76 - 3/77	.0430	2.0839	6.7	3.8	3.4
7- 4/77 - 9/77	.0438	2.1552	5.7	3.1	2.8
8- 10/77 - 3/78	.0484	2.3129	5.5	2.6	2.4
9- 4/78 - 9/78	.0374	1.9144	2.9	1.8	1.6
10- 10/78 - 3/79	.0241	1.4136	1.4	1.3	1.0
SK-Tetracycline/ SKF					
1- 4/74 - 9/74	.0341	1.2089	1.7	1.8	1.8
2- 10/74 - 3/75	.0335	1.2601	2.4	2.5	2.4
3- 4/75 - 9/75	.0335	1.3699	3.5	3.4	3.2
4- 10/75 - 3/76	.0332	1.3127	4.5	4.0	4.0
5- 4/76 - 9/76	.0319	1.3590	3.6	3.1	3.0
6- 10/76 - 3/77	.0252	.9495	1.8	1.8	2.0
7- 4/77 - 9/77	.0250	.8889	1.6	1.5	1.9
8- 10/77 - 3/78	.0217	.8231	1.3	1.4	1.6
9- 4/78 - 9/78	.0195	.7840	1.0	1.2	1.3
10- 10/78 - 3/79	.0180	.7077	.6	.7	.9
Sumycin/Squibb					
1- 4/74 - 9/74	.0511	1.8514	24.5	17.2	16.4
2- 10/74 - 3/75	.0488	1.8747	27.4	19.5	18.3
3- 4/75 - 9/75	.0459	1.9116	25.4	18.1	17.0
4- 10/75 - 3/76	.0459	1.9148	21.9	14.1	13.2
5- 4/76 - 9/76	.0461	2.0630	19.9	11.8	11.0
6- 10/76 - 3/77	.0460	2.1308	16.5	8.7	8.1
7- 4/77 - 9/77	.0460	2.3356	16.1	8.2	7.2
8- 10/77 - 3/78	.0455	2.4507	14.9	7.6	6.2
9- 4/78 - 9/78	.0359	2.1765	10.6	6.9	5.3
10- 10/78 - 3/79	.0244	1.4099	4.0	3.5	2.8

TABLE 8-31, cont.

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Tetracycline HCL, 250 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of Ingred. Cost	Percent of Units	Percent of Rxs
Tetrex/Bristol					
1- 4/74 - 9/74	.1550	4.1062	15.8	3.7	4.8
2- 10/74 - 3/75	.1630	4.1566	13.9	3.0	4.2
3- 4/75 - 9/75	.1759	4.5091	12.2	2.3	3.5
4- 10/75 - 3/76	.1844	4.5991	7.3	1.2	1.8
5- 4/76 - 9/76	.1912	4.7362	6.1	.9	1.5
6- 10/76 - 3/77	.2120	5.3684	4.0	.5	.8
7- 4/77 - 9/77	.2517	6.0126	4.0	.4	.7
8- 10/77 - 3/78	.2599	5.8861	3.0	.3	.5
9- 4/73 - 9/78	.1958	4.9619	1.6	.2	.3
10- 10/78 - 3/79	.0242	.5780	.1	.1	.2
Other Brands/Misc.	N/A	N/A			
1- 4/74 - 9/74			6.7	7.5	7.4
2- 10/74 - 3/75			7.4	7.8	7.6
3- 4/75 - 9/75			8.4	7.9	7.6
4- 10/75 - 3/76			6.7	5.6	5.5
5- 4/76 - 9/76			5.5	4.4	4.5
6- 10/76 - 3/77			5.1	3.6	3.6
7- 4/77 - 9/77			4.2	3.0	3.0
8- 10/77 - 3/78			5.4	3.8	3.9
9- 4/78 - 9/78			3.5	2.6	2.9
10- 10/73 - 3/79			3.1	2.9	2.6
Tetracycline HCL/ Misc.					
1- 4/74 - 9/74	.0188	.6697	26.5	50.9	49.1
2- 10/74 - 3/75	.0168	.6313	23.1	47.7	45.9
3- 4/75 - 9/75	.0164	.6618	25.0	49.8	48.2
4- 10/75 - 3/76	.0165	.6641	31.8	56.7	55.2
5- 4/76 - 9/76	.0164	.6991	38.0	63.3	61.8
6- 10/76 - 3/77	.0164	.7177	49.4	72.7	71.8
7- 4/77 - 9/77	.0165	.7328	53.3	75.9	75.7
8- 10/77 - 3/73	.0171	.7533	57.5	77.9	77.8
9- 4/73 - 9/78	.0206	.9486	72.8	82.3	83.1
10- 10/78 - 3/79	.0213	.9704	87.8	88.7	89.9
Totals					
1- 4/74 - 9/74	.0360	1.2392	100.0	100.0	100.0
2- 10/74 - 3/75	.0347	1.2569	100.0	100.0	100.0
3- 4/75 - 9/75	.0327	1.2765	100.0	100.0	100.0
4- 10/75 - 3/76	.0294	1.1513	100.0	100.0	100.0
5- 4/76 - 9/76	.0273	1.1357	100.0	100.0	100.0
6- 10/76 - 3/77	.0242	1.0446	100.0	100.0	100.0
7- 4/77 - 9/77	.0235	1.0419	100.0	100.0	100.0
8- 10/77 - 3/78	.0232	1.0200	100.0	100.0	100.0
9- 4/73 - 9/78	.0232	1.0820	100.0	100.0	100.0
10- 10/78 - 3/79	.0215	.9928	100.0	100.0	100.0

TABLE 8-32

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Tetracycline HCL, 500 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of		
			Ingred. Cost	Units	Rxs
Achromycin V/ Lederle					
1- 4/74 - 9/74	.0903	2.4867	8.6	8.1	8.4
2- 10/74 - 3/75	.0905	2.8725	9.3	8.8	7.9
3- 4/75 - 9/75	.0895	3.1009	11.0	9.5	8.6
4- 10/75 - 3/76	.0901	2.6903	9.2	6.7	6.8
5- 4/76 - 9/76	.0888	2.8758	8.8	5.7	5.9
6- 10/76 - 3/77	.0872	2.9462	9.1	5.3	5.4
7- 4/77 - 9/77	.0860	3.1331	7.0	3.9	3.9
8- 10/77 - 3/78	.0827	3.6607	7.4	4.2	3.6
9- 4/78 - 9/78	.0596	2.3454	2.6	1.9	1.9
10- 10/78 - 3/79	.0418	1.7096	1.3	1.3	1.3
Panmycin/Upjohn					
1- 4/74 - 9/74	.0819	2.6349	2.3	2.4	2.1
2- 10/74 - 3/75	.0863	2.4712	2.1	2.1	2.0
3- 4/75 - 9/75	.0803	2.6006	2.8	2.7	2.6
4- 10/75 - 3/76	.0776	2.2640	4.2	3.5	3.7
5- 4/76 - 9/76	.0744	2.4665	3.9	3.0	3.0
6- 10/76 - 3/77	.0716	2.9971	3.6	2.6	2.1
7- 4/77 - 9/77	.0792	3.2408	1.4	.8	.8
8- 10/77 - 3/78	.0838	3.8428	1.6	.9	.7
9- 4/78 - 9/78	.0665	2.7669	1.4	.9	.9
10- 10/78 - 3/79	.0449	1.5604	.5	.5	.6
SK-Tetracycline/ SKF					
1- 4/74 - 9/74	.0653	2.0465	3.0	3.9	3.6
2- 10/74 - 3/75	.0645	2.0243	2.6	3.5	3.2
3- 4/75 - 9/75	.0642	2.2321	3.2	3.9	3.5
4- 10/75 - 3/76	.0634	2.1717	5.8	5.9	5.3
5- 4/76 - 9/76	.0607	2.3037	6.2	5.8	5.2
6- 10/76 - 3/77	.0471	1.6778	4.2	4.6	4.4
7- 4/77 - 9/77	.0461	1.9071	3.7	3.8	3.3
8- 10/77 - 3/78	.0423	1.4999	2.9	3.2	3.4
9- 4/78 - 9/78	.0391	1.5365	2.2	2.5	2.6
10- 10/78 - 3/79	.0373	1.6558	1.2	1.4	1.2
Sumycin/Squibb					
1- 4/74 - 9/74	.0976	2.6624	32.2	28.0	29.2
2- 10/74 - 3/75	.0945	2.5229	33.2	30.2	32.2
3- 4/75 - 9/75	.0908	2.6470	30.6	26.0	28.1
4- 10/75 - 3/76	.0901	2.4030	33.9	24.5	28.1
5- 4/76 - 9/76	.0886	2.5562	30.5	19.9	23.1
6- 10/76 - 3/77	.0891	2.4909	25.1	14.4	17.7
7- 4/77 - 9/77	.089[illegible]	2.7685	22.0	11.8	13.8
8- 10/77 - 3/78	.0884	2.8927	21.6	11.5	13.4
9- 4/78 - 9/78	.0687	2.4368	10.8	6.8	7.8
10- 10/78 - 3/79	.0442	1.5691	4.1	4.0	4.4

TABLE 8-32, cont.

Cost Per Unit, Cost Per Rx and Percent Represented by Brands of Tetracycline HCL, 500 MG CAPS, April 1, 1974 - March 31, 1979

Product/ Manufacturer Time Period	Cost/ Unit	Cost/ Rx	Percent of		
			Ingred. Cost	Units[3]	Rx[3]
Tetrex/Bristol					
1- 4/74 - 9/74	.2671	5.2598	35.0	11.2	16.1
2- 10/74 - 3/75	.2670	5.0939	34.9	11.2	16.7
3- 4/75 - 9/75	.2709	6.3199	30.9	8.8	11.9
4- 10/75 - 3/76	.2980	6.0875	19.8	4.3	6.5
5- 4/76 - 9/76	.3186	6.1061	16.1	2.9	5.1
6- 10/76 - 3/77	.3842	7.6621	15.3	2.0	3.5
7- 4/77 - 9/77	.4660	9.0563	16.6	1.7	3.2
8- 10/77 - 3/78	.4848	10.2302	14.8	1.4	2.6
9- 4/78 - 9/78	.3308	7.1263	3.5	.5	.9
10- 10/78 - 3/79	.0456	.7979	.2	.2	.5
Other Brands/Misc.	N/A	N/A			
1- 4/74 - 9/74			6.1	7.9	8.3
2- 10/74 - 3/75			6.2	8.1	7.6
3- 4/75 - 9/75			6.3	7.5	7.7
4- 10/75 - 3/76			5.4	5.5	5.5
5- 4/76 - 9/76			6.3	5.6	4.8
6- 10/76 - 3/77			5.2	4.0	3.9
7- 4/77 - 9/77			4.0	2.9	3.1
8- 10/77 - 3/78			2.1	1.6	1.9
9- 4/78 - 9/78			2.7	2.1	2.2
10- 10/78 - 3/79			3.5	3.4	2.7
Tetracycline HCL/ Misc.					
1- 4/74 - 9/74	.0284	.9619	12.8	38.5	32.3
2- 10/74 - 3/75	.0278	.9415	11.7	36.1	30.4
3- 4/75 - 9/75	.0281	.9775	15.2	41.6	37.6
4- 10/75 - 3/76	.0286	.9812	21.7	49.6	44.1
5- 4/76 - 9/76	.0285	1.0313	28.2	57.1	52.9
6- 10/76 - 3/77	.0285	1.0457	37.5	67.1	63.0
7- 4/77 - 9/77	.0288	1.0952	45.3	75.1	71.9
8- 10/77 - 3/78	.0302	1.1943	49.6	77.2	74.4
9- 4/78 - 9/78	.0392	1.6292	76.8	85.3	83.7
10- 10/78 - 3/79	.0424	1.6532	89.2	89.2	89.3
Totals					
1- 4/74 - 9/74	.0851	2.4181	100.0	100.0	100.0
2- 10/74 - 3/75	.0860	2.4425	100.0	100.0	100.0
3- 4/75 - 9/75	.0772	2.4277	100.0	100.0	100.0
4- 10/75 - 3/76	.0652	1.9908	100.0	100.0	100.0
5- 4/76 - 9/76	.0576	1.9308	100.0	100.0	100.0
6- 10/76 - 3/77	.0510	1.7551	100.0	100.0	100.0
7- 4/77 - 9/77	.0477	1.7382	100.0	100.0	100.0
8- 10/77 - 3/78	.0471	1.7918	100.0	100.0	100.0
9- 4/78 - 9/78	.0435	1.7761	100.0	100.0	100.0
10- 10/78 - 3/79	.0424	1.6578	100.0	100.0	100.0

TABLE 8-33

Projected Savings Estimates, Tetracycline HCL, 250 MG CAPS,

April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	.0232	.0215
- Projected*	.0196	.0175
- Difference	(.0036)	(.0040)
Number of Units	985,994	989,460
Projected Savings (Costs)	($3,550)	($3,958)
Savings based on Rxs:		
Cost Per Rx - Actual	1.0820	.9928
- Projected**	.9679	.9283
- Difference	(.1141)	(.0645)
Number of Rxs	21,176	21,430
Projected Savings (Costs)	($2,416)	($1,382)

* Based on y-intercept of .0382, slope of -.0021, and simple correlation coefficient of .982.

** Based on y-intercept of 1.3237, slope of -.0395, and simple correlation coefficient of .935.

TABLE 8-34

Projected Savings Estimates, Tetracycline HCL, 500 MG CAP, April 1, 1978 - March 31, 1979

Description	Period 9	Period 10
Savings based on Units:		
Cost Per Unit - Actual	.0435	.0424
- Projected*	.0355	.0290
- Difference	(.0080)	(.0134)
Number of Units	155,252	155,333
Projected Savings (Costs)	($1,242)	($2,081)
Savings based on Rxs:		
Cost Per Rx - Actual	1.7761	1.6578
- Projected**	1.5271	1.4082
- Difference	(.2490)	(.2496)
Number of Rxs	3,800	3,976
Projected Savings (Costs)	($946)	($992)

* Based on y-intercept of .0937, slope of -.0065, and simple correlation coefficient of .972.

** Based on y-intercept of 2.5967, slope of -.1189, and simple correlation coefficient of .921.

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TABLE 8-35

Number of Prescriptions and Ingredient Costs for Selected Broad and Medium Spectrum Antibiotics, October 1976 - March 1979

Time Period Product	Prescriptions		Ingredient Costs		Cost Per Rx	
	Number	Percent	Amount	Percent	Amount	% Change from Prior Period
Period 6:						
Tetracycline HCL	31,313	42.4%	$ 35,658.65	11.7%	$ 1.14	--
Cephalexin	8,284	11.2	88,747.16	29.2	10.71	--
Erythromycin	14,885	20.1	43,897.52	14.4	2.50	--
All Other	19,417	26.3	135,702.54	44.6	6.99	--
TOTAL - TABS	73,899	100.0	304,005.87	100.0	4.11	--
Period 7:						
Tetracycline HCL	26,562	40.3%	$ 30,348.39	10.4%	$ 1.14	0.0%
Cephalexin	8,414	12.8	94,703.55	32.3	11.26	+ 5.1
Erythromycin	14,325	21.7	42,683.83	14.6	2.98	+19.2
All Other	16,643	25.2	125,360.27	42.8	7.53	+ 7.7
TOTAL - TABS	65,944	100.0	293,096.04	100.0	4.44	+ 8.0
Period 8:						
Tetracycline HCL	29,596	36.6%	$ 33,340.07	9.2%	$ 1.13	- 0.9%
Cephalexin	9,661	12.0	109,849.21	30.3	11.37	+ 1.0
Erythromycin	20,637	25.5	60,066.04	16.5	2.91	- 2.3
All Other	20,943	25.9	159,816.12	44.0	7.63	+ 1.3
TOTAL - TABS	80,837	100.0	363,071.44	100.0	4.49	+ 1.1
Period 9:						
Tetracycline HCL	24,976	34.7%	$ 29,661.15	8.5%	$ 1.19	+ 5.3%
Cephalexin	9,528	13.2	112,062.73	32.0	11.76	+ 3.4
Erythromycin	18,641	25.9	54,806.60	15.6	2.94	+ 1.0
All Other	18,822	26.2	154,142.88	44.0	8.19	+ 7.3
TOTAL - TABS	71,967	100.0	350,673.36	100.0	4.87	+ 8.5
Period 10:						
Tetracycline HCL	25,406	32.9%	$ 28,048.74	7.6%	$ 1.10	- 7.6%
Cephalexin	10,177	13.2	121,818.45	33.1	11.97	+ 1.8
Erythromycin	22,460	29.1	59,026.95	16.0	2.63	-10.5
All Other	19,248	24.9	159,021.33	43.2	8.26	+ 0.9
TOTAL - TABS	77,291	100.0	367,915.47	100.0	4.76	- 2.3

8.3.4.6 Estimated Overall Impact on Ingredient Cost Reimbursement

The MAC program has resulted in a substantial overall savings on reimbursement of ingredient cost for the five MAC products studied. The savings estimates developed above by product are summarized in Tables 8-36 and 8-37. Since the MAC program was actually implemented during the third month of Period 9, a projection of potential annual savings is best obtained by doubling the Period 10 estimates.

Application of MAC price limitations to chlordiazepoxide HCl and propoxyphene HCl resulted in positive savings. Savings for Periods 9 and 10 exceeded $200,000, while projected annual savings exceed $250,000. The cost-savings objective of the MAC program was achieved with respect to these two products.

Imposition of MAC price on the three antibiotics (ampicillin, penicillin VK and tetracycline) did not however, result in savings, and, in fact, produced some additional costs due to the fashion in which the state implemented the MAC program. Massachusetts substituted the MAC price levels for the formerly lower price-ceilings on the products of miscellaneous manufacturers. Once the MAC price was inserted into the Price File, the claimed cost for these products increased. Since miscellaneous manufacturers account for the majority of old-line antibiotics, the impact of the state's practice was substantial. Additionally, the three products had been experiencing downward trends in overall prices prior to the MAC program. This downward trend resulted in projections of continuously decreasing costs, and may have overstated the additional costs. Depending upon the estimation technique, the full-year additional costs were projected to range between $25,000 and $45,000.

The total annual (net) savings to Massachusetts Medicaid due to MAC price limitations on the five products covered in this study is estimated to range between $203,710 and $239,238--between 12 and 14 percent of the total reimbursement cost (including fee) of these five products. The savings would have been larger if the state had not substituted MAC price limits on the lower-priced non-branded products. We estimate that the annual cost savings would have been at least $67,052 greater, for a total annualized cost-savings ranging from $270,762 to $306,290.

TABLE 8-36

Projected Savings Estimates for MAC Products, based on Cost/Units, April 1, 1978 - March 31, 1979

Product		Period			Full Year Projection*
		9	10	TOTAL	
Chlordiazepoxide HCL,	5 MG CAP	$ 6,048	$ 9,441	$ 15,489	$ 18,882
	10 MG CAP	26,334	40,649	66,983	81,298
	25 MG CAP	10,664	16,428	27,092	32,856
	Total	$ 43,046	$ 66,518	$109,564	$133,036
Propoxyphene HCL,	65 MG CAP	$ 12,765	$ 19,315	$ 32,080	$ 38,630
	65 MG CMPD CAP	25,436	37,729	63,165	75,458
	Total	$ 38,201	$ 57,044	$ 95,245	$114,088
	SUBTOTAL	$ 81,247	$123,562	$204,809	$247,124
Ampicillin,	250 MG CAP	$ (3,183)	$ (3,657)	$ (6,840)	$ (7,314)
	500 MG CAP	(5,390)	(6,370)	(11,760)	(12,740)
	125 MG LIQ	(1,016)	(1,334)	(2,350)	(2,668)
	250 MG LIQ	(859)	(2,346)	(3,205)	(4,692)
	Total	$ (10,448)	$(13,707)	$(24,155)	$(27,414)
Penicillin VK,	250 MG TAB	$ (503)	$ 935	$ 432	$ 1,870
	500 MG TAB	598	850	1,448	1,700
	125 MG LIQ	7	(268)	(261)	(536)
	250 MG LIQ	(988)	(3,478)	(4,466)	(6,956)
	Total	$ (886)	$ (1,961)	$ (2,847)	$ (3,922)
Tetracycline HCL,	250 MG CAP	$ (3,550)	$ (3,958)	$ (7,508)	$ (7,916)
	500 MG CAP	(1,242)	(2,081)	(3,323)	(4,162)
	Total	$ (4,792)	$ (6,039)	$(10,831)	$(12,078)
	SUBTOTAL	$ (16,126)	$(21,707)	$(37,833)	$(43,414)
	GRAND TOTAL	$ 65,121	$101,855	$166,976	$203,710

* Estimated by doubling the savings for Period 10.

TABLE 8-37

Projected Savings Estimates for MAC Products, based on Cost/Rxs, April 1, 1978 - March 31, 1979

Product		Period			Full Year Projection*
		9	10	TOTAL	
Chlordiazepoxide HCL,	**5 MG CAP**	**$ 6,089**	**$ 9,901**	**$ 15,990**	**$ 19,802**
	10 MG CAP	**27,772**	**42,173**	**69,945**	**84,346**
	25 MG CAP	**10,448**	**15,939**	**26,387**	**31,878**
	Total	**$ 44,309**	**$ 68,013**	**$112,322**	**$136,026**
Propoxyphene HCL,	**65 MG CAP**	**$ 15,428**	**$ 22,657**	**$ 38,085**	**$ 45,314**
	65 MG CMPD CAP	**27,382**	**40,218**	**67,600**	**80,436**
	Total	**$ 42,810**	**$ 62,875**	**$105,685**	**$125,750**
	SUBTOTAL	**$ 87,119**	**$130,888**	**$218,007**	**$ 261,776**
Ampicillin,	**250 MG CAP**	**$ (2,906)**	**$ (2,680)**	**$ (5,586)**	**$ (5,360)**
	500 MG CAP	**(3,339)**	**(2,696)**	**(6,035)**	**(5,392)**
	125 MG LIQ	**(1,016)**	**(1,334)**	**(2,350)**	**(2,668)**
	250 MG LIQ	**(859)**	**(2,346)**	**(3,205)**	**(4,692)**
	Total	**$ (8,120)**	**$ (9,056)**	**$(17,176)**	**$(18,112)**
Penicillin VK,	**250 MG TAB**	**$ 716**	**$ 2,135**	**$ 2,851**	**$ 4,270**
	500 MG TAB	**1,357**	**1,772**	**3,129**	**3,544**
	125 MG LIQ	**7**	**(268)**	**(261)**	**(536)**
	250 MG LIQ	**(988)**	**(3,478)**	**(4,466)**	**(6,956)**
	Total	**$ 1,092**	**$ 161**	**$ 1,253**	**$ 322**
Tetracycline HCL,	**250 MG CAP**	**$ (2,416)**	**$ (1,382)**	**$ (3,798)**	**$ (2,764)**
	500 MG CAP	**(946)**	**(992)**	**(1,938)**	**(1,984)**
	Total	**$ (3,362)**	**$ (2,374)**	**$ (5,736)**	**$ (4,748)**
	SUBTOTAL	**$ (10,390)**	**$(11,269)**	**$ (21,659)**	**$ (22,538)**
	GRAND TOTAL	**$ 76,729**	**$119,619**	**$ 196,348**	**$ 239,238**

*** Estimated by doubling the savings for Period 10**

8.3.4.7 Comparative Manufacturer Costs

Massachusetts claims data were compiled to reflect total reimbursements for products manufactured by each of 10 firms. Four of the selected firms have been directly affected by the MAC limits, while another six firms were not major suppliers of the 15 MAC dosage forms covered in this study:

MAC-Affected Manufacturers

Lilly (Darvon/Propoxyphene) (V-Cillin-K/Penicillin-VK)
Lederle (Achromycin V/Tetracycline)
Roche (Librium/Chlordiazepoxide)
Squibb (Principen/Ampicillin)(Sumycin/Tetracycline)

Other Manufacturers

Abbott
Burroughs-Wellcome
MSD
Pfizer
SKF
Upjohn

The comparison between these two manufacturer groups is limited to tablet/capsule dosage forms to avoid problems created by the inconsistency of unit measures for other product forms. The total product-line data for the companies are shown in Tables 8-38 and 8-39. This information was used to prepare the linear projections found in Tables 8-40 and 8-41.

Unfortunately, the results are not easy to interpret. The Other Manufacturers category has a relatively much greater representation among the direct price EAC drugs, 27 products compared to only six for the MAC-affected manufacturers. That is, we know a priori that the EAC has had relatively greater impact on the non-MAC affected manufacturers, severely limiting the value of any Period 10 comparisons. Note the abrupt reduction in per-unit and per-prescription ingredient cost reimbursement for the other manufacturers in Periods 10. A downward shift in market share due to the relatively greater stringency of the EAC vis-a-vis these manufacturers is likewise implied.

The actual per-unit and per-prescription costs for the MAC-affected manufacturers in Period 9 fall short of the projections. No doubt this reflects the direct impact of the MAC program, pharmacies continuing to dispense the brand name MAC product but receiving reduced reimbursement. However, in Period 10 it is interesting to note that the per-unit costs increase sharply and nearly attain the level that would have prevailed if neither MAC nor EAC had been implemented. This tends to suggest a pricing response by the MAC-affected manufacturers--i.e., prices having increased on non-MAC products more than they otherwise would have. However, another explanation is possible. MAC-product figures were included in the manufacturer totals and the abrupt price increase may simply reflect the changed composition of the product line brought about by MAC. As MAC product sales decline, the sales of a manufacturer's higher-priced drugs still on patent become a relatively greater part of the total sales volume. MAC product sales should perhaps have been excluded, or at least tabulated separately. In any event, the impact of the MAC program on MAC-affected manufacturer market share is rather dramatic--e.g., showing a total shortfall in sales during Period 10 in excess of half a million dollars.

Table 8-38: Utilization Experience for MAC-Affected Manufacturers, April 1, 1974 - March 31, 1979

Product/Manufacturer Time Period	Number of Rxs	Number of Units	Ingredient Costs	Cost per Unit	Cost per Rx	Units per Rx
Lilly						
1- 4/74 - 9/74	151,861	5,857,843	433,926.71	.0741	2.8574	38.6
2- 10/74 - 3/75	175,878	6,024,926	518,168.13	.0860	2.9462	34.3
3- 4/75 - 9/75	161,250	6,691,817	546,686.27	.0817	3.3903	41.5
4- 10/75 - 3/76	142,589	6,114,531	518,516.39	.0848	3.6364	42.9
5- 4/76 - 9/76	147,692	6,494,984	565,080.20	.0870	3.8261	44.0
6- 10/76 - 3/77	128,711	5,825,659	527,865.00	.0906	4.1012	45.3
7- 4/77 - 9/77	117,078	5,188,030	503,127.12	.0970	4.2974	44.3
8- 10/77 - 3/78	117,477	5,245,477	554,220.73	.1057	4.7177	44.7
9- 4/78 - 9/78	106,746	4,956,546	503,914.73	.1017	4.7207	46.4
10- 10/78 - 3/79	79,619	3,593,064	412,726.62	.1149	5.1838	45.1
Lederle						
1- 4/74 - 9/74	66,661	2,558,142	126,167.38	.0493	1.8927	38.4
2- 10/74 - 3/75	80,420	3,126,526	173,374.41	.0555	2.1559	38.9
3- 4/75 - 9/75	78,218	3,141,895	175,014.92	.0557	2.2375	40.2
4- 10/75 - 3/76	74,133	3,012,874	158,053.88	.0525	2.1320	40.6
5- 3/76 - 9/76	80,427	3,335,839	177,230.18	.0531	2.2036	41.5
6- 10/76 - 3/77	73,714	3,172,302	177,414.26	.0559	2.4068	43.0
7- 4/77 - 9/77	70,133	3,143,943	188,282.84	.0599	2.6847	44.8
8- 10/77 - 3/78	72,958	3,284,488	204,989.64	.0624	2.8097	45.0
9- 4/78 - 9/78	75,435	3,425,195	194,951.96	.0569	2.5844	45.4
10- 10/78 - 3/78	66,435	3,099,827	169,643.02	.0547	2.5535	46.7
Roche						
1- 4/74 - 9/74	230,516	10,719,950	792,506.42	.0739	3.4380	46.5
2- 10/74 - 3/75	274,892	13,193,716	978,513.52	.0742	3.5596	48.0
3- 4/75 - 9/75	271,825	13,350,586	1,011,780.84	.0758	3.7222	49.1
4- 10/75 - 3/76	235,381	11,708,180	913,702.25	.0780	3.8818	49.7
5- 4/76 - 9/76	252,286	12,534,549	1,064,085.48	.0849	4.2178	49.7
6- 10/76 - 3/77	228,230	11,465,451	1,052,578.19	.0918	4.6119	50.2
7- 4/77 - 9/77	218,305	11,014,482	1,040,493.82	.0945	4.7662	50.5
8- 10/77 - 3/78	216,575	10,889,422	1,076,037.30	.0988	4.9684	50.3
9- 4/78 - 9/78	211,967	10,667,295	1,065,883.24	.0999	5.0285	50.3
10- 10/78 - 3/79	174,520	8,578,690	892,181.84	.1040	5.1122	49.2

Table 8-38 (continued)

Product/Manufacturer Time Period	Number of Rxs	Number of Units	Ingredient Costs	Cost per Unit	Cost per Rx	Units per Rx
Squibb						
1- 4/74 - 9/74	66,760	1,516,563	231,401.12	.1526	3.4662	22.7
2- 10/74 - 3/75	79,405	1,823,097	284,928.13	.1563	3.5883	23.0
3- 4/75 - 9/75	71,765	1,708,861	282,670.20	.1654	3.9388	23.8
4- 10/75 - 3/76	67,304	1,546,962	280,342.84	.1812	4.1653	23.0
5- 4/76 - 9/76	65,180	1,536,154	294,411.02	.1917	4.5169	23.6
6- 10/76 - 3/77	53,412	1,280,144	263,499.13	.2058	4.9333	24.0
7- 4/77 - 9/77	48,583	1,167,493	262,641.86	.2250	5.4060	24.0
8- 10/77 - 3/78	47,726	1,133,666	287,634.09	.2537	6.0268	23.8
9- 4/78 - 9/78	45,429	1,077,649	286,064.15	.2655	6.2970	23.7
10- 10/78 - 3/79	38,980	879,683	264,473.03	.3006	6.7848	22.6
Total MAC-Affected Manufacturers						
1- 4/74 - 9/74	515,798	20,652,498	1,584,001.63	.0767	3.0710	40.0
2- 10/74 - 3/75	610,595	24,168,265	1,954,984.19	.0809	3.2018	39.6
3- 4/75 - 9/75	583,058	24,893,159	2,016,152.23	.0810	3.4579	42.7
4- 10/75 - 3/76	519,407	22,382,547	1,870,615.36	.0836	3.6014	43.1
5- 4/76 - 9/76	545,585	23,901,526	2,100,806.88	.0879	3.8506	43.8
6- 10/76 - 3/77	484,067	21,743,556	2,021,356.58	.0930	4.1758	44.9
7- 4/77 - 9/77	454,099	20,513,948	1,994,545.64	.0972	4.3923	45.2
8- 10/77 - 3/78	454,736	20,553,053	2,122,881.76	.1033	4.6684	45.2
9- 4/78 - 9/78	439,577	20,126,685	2,050,814.08	.1019	4.6654	45.8
10- 10/78 - 3/79	359,554	16,151,264	1,739,024.51	.1077	4.8366	44.9

Table 8-39: Experience for Other Manufacturers, April 1, 1974 - March 31, 1979

Product/Manufacturer Time Period	Number of Rxs	Number of Units	Ingredient Costs	Cost per Unit	Cost per Rx	Units per Rx
Abbott						
1- 4/74 - 9/74	39,463	1,119,268	116,967.29	.1045	2.9640	28.4
2- 10/74 - 3/75	50,559	1,445,277	164,156.27	.1136	3.2468	28.6
3- 4/75 - 9/75	50,557	1,529,225	176,463.41	.1154	3.4904	30.2
4- 10/75 - 3/76	51,313	1,486,680	189,800.12	.1277	3.6989	29.0
5- 4/76 - 9/76	55,812	1,663,156	219,945.75	.1322	3.9408	29.8
6- 10/76 - 3/77	53,983	1,600,092	219,698.13	.1373	4.0698	29.6
7- 4/77 - 9/77	50,081	1,574,488	214,935.62	.1365	4.2918	31.4
8- 10/77 - 3/78	58,427	1,859,653	291,006.16	.1565	4.9807	31.8
9- 4/78 - 9/78	57,335	2,025,591	264,855.54	.1308	4.6194	35.3
10- 10/78 - 3/79	58,424	1,996,565	258,775.26	.1296	4.4293	34.2
Burroughs-Wellcome						
1- 4/74 - 9/74	90,444	2,841,327	113,391.90	.0399	1.2537	31.4
2- 10/74 - 3/75	114,192	3,650,856	150,424.26	.0412	1.3173	32.0
3- 4/75 - 9/75	114,500	3,720,847	170,795.70	.0459	1.4917	32.5
4- 10/75 - 3/76	111,982	3,726,468	175,749.33	.0472	1.5694	33.3
5- 3/76 - 9/76	108,428	4,026,810	181,720.23	.0451	1.6760	37.1
6- 10/76 - 3/77	89,961	3,632,332	157,574.81	.0434	1.7516	40.4
7- 4/77 - 9/77	88,899	3,534,854	165,805.75	.0469	1.8651	39.8
8- 10/77 - 3/78	90,773	3,701,018	172,358.97	.0466	1.8988	40.8
9- 4/78 - 9/78	100,133	4,023,493	204,978.41	.0509	2.0471	40.2
10- 10/78 - 3/78	89,745	3,660,635	178,968.40	.0489	1.9942	40.8
MSD						
1- 4/74 - 9/74	170,283	8,512,346	659,721.43	.0775	3.8743	50.0
2- 10/74 - 3/75	199,240	10,519,109	824,185.62	.0784	4.1366	52.8
3- 4/75 - 9/75	200,358	11,014,773	896,808.82	.0814	4.4760	55.0
4- 10/75 - 3/76	182,750	10,510,046	880,616.45	.0838	4.8187	57.5
5- 4/76 - 9/76	204,239	12,058,473	1,047,386.60	.0869	5.1282	59.0
6- 10/76 - 3/77	184,513	11,202,820	1,014,531.19	.0906	5.4984	60.7
7- 4/77 - 9/77	178,278	10,905,140	1,041,143.63	.0955	5.8400	61.2
8- 10/77 - 3/78	174,135	10,861,661	1,108,600.43	.1021	6.3663	62.4
9- 4/78 - 9/78	184,839	11,623,457	1,216,537.10	.1047	6.5816	62.9
10- 10/78 - 3/79	151,510	9,791,204	954,220.90	.0975	6.2981	64.6

Table 8-39 (continued)

Product/Manufacturer Time Period	Number of Rxs	Number of Units	Ingredient Costs	Cost per Unit	Cost per Rx	Units per Rx
SKF						
1- 4/74 - 9/74	95,496	3,603,390	281,736.67	.0782	2.9502	37.7
2- 10/74 - 3/75	111,163	4,358,221	346,941.49	.0796	3.1210	39.2
3- 4/75 - 9/75	104,020	4,306,170	361,764.09	.0840	3.4778	41.4
4- 10/75 - 3/76	98,016	4,098,383	360,653.22	.0880	3.6795	41.8
5- 4/76 - 9/76	102,484	4,574,055	399,236.26	.0873	3.8956	44.6
6- 10/76 - 3/77	88,811	4,202,492	359,633.24	.0856	4.0494	47.3
7- 4/77 - 9/77	82,842	4,053,688	348,045.19	.0859	4.2013	48.9
8- 10/77 - 3/78	86,859	4,334,956	410,225.40	.0946	4.7229	49.9
9- 4/78 - 9/78	98,979	5,185,856	545,153.28	.1051	5.5078	52.4
10- 10/78 - 3/79	91,285	4,925,552	553,451.19	.1124	6.0629	54.0
Upjohn						
1- 4/74 - 9/74	46,102	2,066,664	235,984.70	.1142	5.1188	44.8
2- 10/74 - 3/75	57,732	2,730,423	306,961.52	.1124	5.3170	47.3
3- 4/75 - 9/75	57,819	2,844,104	329,283.32	.1158	5.6951	49.2
4- 10/75 - 3/76	63,620	3,324,404	389,705.38	.1172	6.1255	52.3
5- 4/76 - 9/76	74,493	4,205,507	513,819.79	.1222	6.8976	56.5
6- 10/76 - 3/77	66,139	4,041,795	501,761.50	.1241	7.5865	61.1
7- 4/77 - 9/77	65,504	4,153,673	534,711.05	.1287	8.1630	63.4
8- 10/77 - 3/78	69,744	4,579,661	617,897.07	.1349	8.8595	65.7
9- 4/78 - 9/78	73,845	4,991,864	681,086.89	.1364	9.2232	67.6
10- 10/78 - 3/79	65,519	4,540,459	530,535.41	.1168	8.0974	69.3
Total - Other Manufacturers						
1- 4/74 - 9/74	478,223	19,531,841	1,580,763.21	.0809	3.3055	40.8
2- 10/74 - 3/75	577,787	24,427,285	2,018,470.99	.0826	3.4935	42.3
3- 4/75 - 9/75	571,140	25,146,751	2,166,654.50	.0862	3.7936	44.0
4- 10/75 - 3/76	547,543	24,751,403	2,215,800.27	.0895	4.0468	45.2
5- 4/76 - 9/76	586,995	28,277,854	2,605,224.77	.0921	4.4382	48.2
6- 10/76 - 3/77	519,763	26,295,077	2,485,176.73	.0945	4.7814	50.6
7- 4/77 - 9/77	498,969	25,763,478	2,534,895.62	.0984	5.0803	51.6
8- 10/77 - 3/78	514,384	26,974,933	2,852,980.83	.1058	5.5464	52.4
9- 4/78 - 9/78	550,862	29,619,297	3,197,489.53	.1080	5.8045	53.8
10- 10/78 - 3/79	490,229	26,585,557	2,738,265.43	.1030	5.5857	54.2

TABLE 8-40

Actual vs. Projected Experience--MAC-Affected Manufacturers

	Period 9	Period 10
Number of Rxs		
Actual	439,577	359,554
Projected	441,594	423,967
Number of Units		
Actual	20,126,685	16,151,264
Projected	20,910,130	20,589,921
Ingredient Cost		
Actual	$2,050,814	$1,739,024
Projected	2,185,108	2,225,770
Cost Per Unit		
Actual	$0.1019	$0.1077
Projected	0.1045	0.1081
Cost Per Rx		
Actual	$4.665	$4.837
Projected	4.849	5.082

TABLE 8-41

Actual vs. Projected Experience--Other Manufacturers

	Period 9	Period 10
Number of Rxs		
Actual	550,862	490,229
Projected	523,155	520,112
Number of Units		
Actual	29,619,297	26,585,557
Projected	28,668,616	29,451,402
Ingredient Costs		
Actual	$3,197,489	$2,738,265
Projected	3,047,474	3,227,874
Cost Per Unit		
Actual	$0.1080	$0.1030
Projected	0.1063	0.1096
Cost Per Rx		
Actual	$5.804	$5.586
Projected	5.756	6.077

8.3.5 EAC Product Tests

The state implemented a three-part EAC price limitation on September 14, 1978. This section evaluates the cost-savings effect of each part: (1) volume wholesale price, (2) direct price and (3) AWP less 5 percent. This section also considers whether or not changes in the dispensing fee can be attributed to the MAC program.

8.3.5.1 Volume Wholesale Price

The state identified a total of 26 products that normally are purchased in large package sizes. Twenty (20) of these 26 products were non-MAC products and had the EAC set at the volume wholesale price, the per-unit price for larger package sizes, less a five (5) percent discount. Since tablet forms of these 20 products represent 99.12 percent of all prescriptions in this category, only tablet utilization experience is shown in Table 8-42.

Both cost per unit and cost per prescription exhibit absolute descreases for Period 10. Projected savings estimated for this product category are shown in Table 8-43. The savings for a six-month period are estimated to range between $72,882 and $90,348, meaning that annual savings range between $145,000 and $180,000. No savings estimates are given for the small percentage of liquid prescriptions.

8.3.5.2 Direct Price

The state identified 42 non-MAC products that normally are purchased directly from manufacturers. These products were reimbursed at the direct manufacturer's price, effective September 14, 1977. The direct price products were classified into three dosage-form types: tablets, liquids, and tablet paks (oral contraceptives). Since tablets and tablet sales represent 96.9% of the total presciptions in the direct price category, only these two dosage types were used. See Tables 8-42 and 8-43.

Tablets decreased substantially in cost during Period 10, while oral contraceptives, having experienced price increases nationally during the past several years, exhibited higher costs despite adoption of the direct price as basis for reimbursement. The total projected savings in Period 10 ranged from $275,911 to $278,585, meaning that annualized cost savings exceeded $550,000.

8.3.5.3. AWP Less 5 Percent

The amount of reimbursement for other EAC products was computed by subtracting from total program reimbursement the combined reimbursement for MAC, volume EAC products, and direct EAC products. The estimated total amount of dispensing fees was then removed from the total other reimbursement figures to obtain the ingredient cost figures shown in Table 8-44. If the trend in average ingredient cost per prescription for the first nine periods had continued, the per-prescription ingredient cost for Period 10 would had been $5.58.[1] Since the actual per-prescription cost was $5.17, the total six-month savings from this portion of the EAC program is estimated to be $656,718.

As another estimation alternative, we might take the $8,286,086.68 amount paid in reimbursement of ingredient costs for other products in Period 10 and assume this

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[1] Based on y-intercept of 2.3775, slope of .3205, and sample correlation coeficient of .983.

TABLE 8-42

Summarized Utilization Data for Volume Purchase and Direct Purchase (Non-MAC) EAC Products, April 1, 1974 - March 31, 1979

Product Category Time Periods	Number of Rxs	Number of Units	Ingredient Costs	Cost Per Unit	Cost Per RX	Units Per RX
Volume Purchase (Tablets Only):						
1 - 4/74 - 9/74	347,547	15,514,213	$1,003,458.94	.0647	2.8873	44.6
2 - 10/74 - 3/75	430,093	19,702,058	1,285,433.51	.0652	2.9887	45.8
3 - 4/75 - 9/75	437,997	20,586,155	1,405,350.16	.0683	3.2086	47.0
4 - 10/75 - 3/76	400,223	19,277,960	1,343,573.20	.0697	3.3571	48.2
5 - 4/76 - 9/76	446,840	21,753,224	1,567,801.98	.0725	3.5288	48.7
6 - 10/76 - 3/77	411,374	20,391,301	1,553,166.87	.0762	3.7756	49.6
7 - 4/77 - 9/77	405,924	20,271,675	1,585,714.18	.0782	3.9064	49.9
8 - 10/77 - 3/78	412,148	20,769,410	1,678,963.71	.0808	4.0737	50.4
9 - 4/78 - 9/78	435,909	22,253,654	1,846,686.85	.0830	4.2364	51.1
10- 10/78 - 3/79	384,131	19,697,818	1,608,840.75	.0817	4.1883	51.3
Direct Purchase (Tablets Only):						
1 - 4/74 - 9/74	278,594	15,152,061	$1,037,372.28	.0685	3.7236	54.4
2 - 10/74 - 3/75	332,603	19,019,096	1,326,713.98	.0698	3.9889	57.2
3 - 4/75 - 9/75	335,383	20,071,633	1,446,723.00	.0721	4.3136	59.8
4 - 10/75 - 3/76	316,122	19,709,282	1,475,173.21	.0748	4.6665	62.3
5 - 4/76 - 9/76	357,908	23,170,553	1,791,520.28	.0773	5.0055	64.7
6 - 10/76 - 3/77	325,749	21,897,170	1,747,606.63	.0798	5.3649	67.2
7 - 4/77 - 9/77	317,987	21,970,999	1,827,343.92	.0832	5.7466	69.1
8 - 10/77 - 3/78	323,741	22,880,884	1,986,334.30	.0868	6.1356	70.7
9 - 4/78 - 9/78	346,136	24,989,323	2,201,973.69	.0881	6.3616	72.2
10- 10/78 - 3/79	291,296	21,657,447	1,687,252.85	.0779	5.7922	74.3
Direct Purchase (Oral Contraceptives):						
1 - 4/74 - 9/74	17,699	19,078	38,522.86	2.0197	2.1766	1.1
2 - 10/74 - 3/75	22,929	24,377	50,231.00	2.0606	2.1907	1.1
3 - 4/75 - 9/75	23,726	25,501	50,742.24	1.9898	2.1387	1.1
4 - 10/75 - 3/76	20,711	22,250	45,311.43	2.0365	2.1878	1.1
5 - 4/76 - 9/76	20,273	22,546	48,773.68	2.1633	2.4058	1.1
6 - 10/76 - 3/77	16,484	18,268	40,842.05	2.2357	2.4777	1.1
7 - 4/77 - 9/77	15,141	17,365	41,183.35	2.3716	2.7200	1.1
8 - 10/77 - 3/78	13,631	15,627	49,967.37	3.1975	3.6657	1.1
9 - 4/78 - 9/78	12,856	14,679	52,709.73	3.5908	4.1000	1.1
10- 10/78 - 3/79	10,450	11,848	42,006.25	3.5454	4.0197	1.1

TABLE 8-43

Project Savings Estimates from Volume Purchase and Direct Purchase EAC Products, October 1, 1978 - March 31, 1979

Description	Period 10 Projections		
	Volume Purchase (Tablets Only)	Direct Purchase (Tablets Only)	Direct Purchase (Oral Contraceptives)
Savings based on Units:			
Cost Per Unit - Actual	.0817	.0779	3.5454
- Projected*	.0854	.0909	3.2954
- Difference	.0037	.0130	(.2500)
Number of Units	19,597,818	21,657,447	11,848
Projected Savings (Costs)	$ 72,882	$ 281,547	$ (2,962)
Savings based on Rxs:			
Cost Per Rx: - Actual	4.1883	5.7922	4.0197
- Projected**	4.4235	6.7471	3.8046
- Difference	.2352	.9549	(.2151)
Number of Rxs	384,131	291,296	10,450
Project Savings (Costs)	$ 90,348	$ 278,159	$ (2,248)

*Projections based on the following figures:

	Y-intercept	Slope	Correlation Coefficient
Volume Purchase (Tablets Only)	.0610	.0024	.9943
Direct Purchase (Tablets Only)	.0648	.0026	.9954
Direct Purchase (Oral Contraceptives)	1.5191	.1776	.8377

**Projections based on the following figures:

	Y-intercept	Slope	Correlations Coefficient
Volume Purchase (Tablets Only)	2.6793	.1744	.9983
Direct Purchase (Tablets Only)	3.3210	.3426	.9990
Direct Purchase (Oral Contraceptives)	1.5427	.2262	.8618

amount reflects a 5 (five) percent reduction from what would have been spent. The estimated six-month savings is then $436,110.

8.3.5.4 Dispensing Fee

The average dispensing fee in Massachusetts for each of the 10 study periods is shown in Table 8-45. The table also indicates what the dispensing fee levels might have been, assuming different alternative rates of pharmacy cost inflation taking Period 1 as the base. The difference between actual Period 1 and Period 10 fees is seen to correspond to an average annual rate of price increase amounting to slightly more than 8 percent. However, the fee had remained at $2.10 for more than three years, so that overall payments during the study period were considerably less than what they would have been with uniform annual increases of 8 percent.

Since the MAC program requires all states to conduct surveys of pharmacy operating costs, the abrupt and sizable increase in the dispensing fee at time of EAC implementation may appear to be due to the MAC program. However, closer examination is required. The Medicaid dispensing fee in Massachusetts is established by the Massachusetts Rate Setting Commission and the Commission had authorized the Massachusetts College of Pharmacy to conduct the mandated dispensing cost survey. A report of the survey's findings was released on September 20, 1977--based on 350 usable surveys received from the 1,420 Medicaid participating pharmacies. The mean dispensing cost in 1975 was found to be $2.32. After adjusting this figure to include inflation and profit, the report recommended a dispensing fee of $2.85. Although the report was released in September 1977, the fee was not adjusted until "new" EAC price limits were imposed in October 1978. The state's original intent

TABLE 8-44

Estimated Ingredient Cost Reimbursements for Other EAC Products

Time Period	Number of Prescriptions				Total Reimbursements				Ingredient Costs For Other Products	
	Total	MAC	Volume & Direct	Other EAC	Total	MAC	Volume & Direct	Other EAC	Amount	Per Rx
1 - 4/74 - 9/74	2,515,844	244,596	673,208	1,598,040	12,105,223.98	1,167,557.20	3,381,434.00	7,556,232.78	4,599,858.78	2.88
2 - 10/74 - 3/75	3,009,318	285,515	827,747	1,896,056	14,500,732.47	1,382,538.11	4,322,876.54	8,795,317.82	5,135,929.74	2.71
3 - 4/75 - 9/75	2,925,179	257,363	836,116	1,831,700	16,167,950.98	1,304,237.44	4,718,949.25	10,144,764.29	6,298,194.29	3.44
4 - 10/75 - 3/76	2,823,227	246,204	782,446	1,794,577	15,896,751.31	1,232,593.16	4,615,958.16	10,048,199.46	6,279,587.76	3.50
5.- 4/76 - 9/76	2,827,501	244,341	850,490	1,732,670	17,200,152.64	1,236,238.18	5,268,466.67	10,695,402.79	7,056,795.79	4.07
6 - 10/76 - 3/77	2,510,509	216,692	768,757	1,525,060	16,038,151.15	1,075,120.39	4,975,706.53	9,987,324.23	6,784,698.23	4.45
7 - 4/77 - 9/77	2,441,735	195,658	752,670	1,493,407	16,133,340.75	962,638.30	5,011,264.54	10,159,417.91	7,023,263.21	4.70
8 - 10/77 - 3/78	2,526,289	207,826	764,110	1,554,353	17,094,350.19	1,011,943.99	5,240,839.00	10,841,567.20	7,577,425.90	4.87
9 - 4/78 - 9/78	2,658,522	193,404	809,458	1,655,690	18,798,024.45	907,813.38	5,759,062.68	12,131,148.39	8,604,528.69	5.20
10- 10/78 - 3/79	2,483,251	182,474	699,027	1,601,750	18,525,214.22	849,092.98	5,065,309.56	12,610,811.68	8,286,086.68	5.17

TABLE 8-45
Average Annual Dispensing Fee, by Time Period and Selected Projection

Time Period	Dispensing Fee					
	Actual	Projected, Assuming Alternative Rates of Inflation				
		6.0%	7.0%	8.0%	9.0%	10.0%
1-4/74-9/94	$1.85	$1.85	$1.85	$1.85	$1.85	$1.85
2-10/74-3/75	$1.93	$1.91	$1.91	$1.92	$1.93	$1.94
3-4/75-9/75	$2.10	$1.96	$1.98	$2.00	$2.02	$2.04
4-10/75-3/76	$2.10	$2.02	$2.05	$2.08	$2.11	$2.14
5-4/75-9/76	$2.10	$2.08	$2.12	$2.16	$2.21	$2.25
6-10/76-3/77	$2.10	$2.14	$2.20	$2.25	$2.31	$2.36
7-4/75-9/77	$2.10	$2.21	$2.27	$2.34	$2.41	$2.48
8-10/77-3/78	$2.10	$2.27	$2.35	$2.43	$2.52	$2.60
9-4/75-9/78	$2.34	$2.34	$2.43	$2.53	$2.63	$2.73
10-10/78-3/79	$2.70	$2.41	$2.52	$2.63	$2.75	$2.87

had been to raise the dispensing fee to $2.60, but after holding hearings and receiving testimony from the Massachusetts State Pharmaceutical Association, the fee was eventually set at $2.70. Inasmuch as the fee recommendation was increased from $2.60 to $2.70 after hearing arguments concerning the pharmacy revenue losses expected to result from the EAC program, this $0.10 fee difference could possibly be attributed to the EAC program.[1] The implied cost-savings offset in Period 10 would amount to $248,325--equal to $0.10 times the actual prescription volume (2,483,251). The cost-savings offset on an annualized basis would thus amount to $551,822.

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[1] The multivariate analyses in Phase II should permit a more reliable determination of impacts on the dispensing fees. The possibility of strategic behavior makes more judgemental determination somewhat unreliable.

8.3.6 State Administrative Costs

The costs of implementing and operating the MAC-EAC program in Massachusetts have been minimal. Nevertheless, it is important to identify the various administrative cost components and estimate the aggregate costs as well as we can.

8.3.6.1 Implementation Costs

In support of EAC development a Research Analyst at the Massachusetts Rate Setting Commission spent 3-4 months investigating acquisition and dispensing patterns in the state--to distinguish products commonly purchased directly from the maufacturer and to determine the most frequently purchased products. The estimated cost was about \$15,000.[1] This modest research expense was apparently the only incremental cost incurred by the state in implementing the MAC-EAC program.[2] Whereas development of the EAC also involved some meetings and consultation among state Medicaid personnel, such personnel inputs entailed no incremental cost to the state. The state's Director of Pharmacy Reimbursement spent the largest amount of time on MAC-EAC implementation, perhaps 2-3 months in total. In addition to working on the EAC, he performed the following tasks:

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[1] Estimated salary expense was \$7,333, equal to \$22,000 per year times 1/3 year. However, this figure can be multiplied by two in order to take account of fringe benefits, secretarial inputs and other overhead expenses.

[2] The Massachusetts Director of Pharmacy Reimbursement noted that providers were the ones incurring substantial implementation expense. In particular, he indicated that much pharmacist time was consumed in physician "call-backs" to explain that the prescribed brand would not be dispensed without "brand necessary" certification. He also cited the expense and confusion in converting nursing homes to generic lines.

- wrote 4-5 memoranda to the pharmacies,[1]
- conducted discussions with the Massachussetts State Pharmaceutical Association,
- contributed to a newsletter of the Massachussetts State Pharmaceutical Association, and
- answered telephone inquiries from pharmacists.

Inasmuch as no additional personnel were required to assist the pharmacy consultant with his other responsibilities, these implementation-related activities involved no incremental cost to the state. The mandated dispensing fee survey was conducted by the Massachusetts College of Pharmacy at no cost to the state.

Pilgrim Health Systems Inc., the fiscal intermediary, also incurred no substantial cost. No reprogramming was involved. The MAC prices and new EAC prices were merely substituted on the pre-existing Price File. Physician-certified "over-rides" were easily accommodated within the pre-existing manual processing mode.

8.3.6.2 Operating Costs

The incremental operating or continuing costs to the state of the MAC-EAC program are virtually insignificant. Our most recent data indicate that fewer than 1,000 "brand-necessary" over-rides are being processed per year. At $0.10 per manually-processed claim--an estimate provided by Pilgrim Health Systems--the incremental cost of processing these over-rides amounts to less than $100 per year. Some very nominal expense is also incurred in updating the Price File to reflect MAC-price charges; however, it is not obvious that the frequency of price change is any greater than it would have been without the MAC program. The states's pharmacy consultant estimates that he now spends only 1-2 percent of his time on the MAC program, but once again at no additional cost to the state.

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[1] These were sent out with other materials and there was no incremental postage expense.

Unquestionably, the Massachusetts experience in administering the MAC/EAC program is not typical. The mandated dispensing fee survey was performed on a complimentary basis and the state's comparatively sophisticated claims processing system at Pilgrim Health required no modification. We may expect that the incremental administrative costs will be at least somewhat higher in other states. The administrative costs will be determined for four additional sample states in Phase II of the project. In addition, administrative costs at the Federal level will be assessed.

8.3.7 Changes in Dispensing Patterns

The MAC program has had a very substantial impact on dispensing patterns with respect to chlordiazepoxide and propoxyphene HCl, the only two MAC product markets formerly dominated by more expensive brand-name entities. See the time trend in per-unit market share for Librium (chlordiazepoxide) and Darvon (propoxyphene HCl) in Table 8-46. The abrupt reductions in market share for these products during Periods 9 and 10 clearly reflects the impact of the MAC program; no linear projections are required to detect this dramatic, albeit expected shift in pharmacy dispensing patterns. Nevertheless, it is perhaps significant that these higher-priced brand name products continued to be dispensed at all. It suggests that pharmacists are at least temporarily taking a loss on ingredient costs due to the MAC program. Taking the per-unit ingredient cost reimbursement in Period 8 as an estimate of the acquisition cost, we project that pharmacies continuing to dispense Darvon and Librium lost a total of $51,497 in Period 9 and $34,151 in Period 10.[1] This amounted to 79.1 percent of the total estimated MAC-related savings in Period 9 and 33.5 percent of the estimated savings in Period 10. If the financial burden imposed on pharmacies were to continue indefinitely at such sizeable levels, it could be a serious problem for the MAC program. However, it seems more likely that market share for Librium and Darvon will continue to decline sharply. There certainly is no evidence yet that equilibrium has been achieved.

Only 433 physician-certified MAC over-rides were processed in Period 10, 0.24 percent of MAC prescription volume in that time period. Unfortunately, a comparable figure for Period 9 was not available. Nevertheless, representatives of Pilgrim Health--the fiscal intermediary--thought that the frequency of over-rides might be increasing somewhat over time as physicians came to understand the over-ride mechanism.

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[1] These figures over-state pharmacy losses to the extent that the state's ingredient cost reimbursement level in Period 8 exceeded actual acquisition costs.

Reliable information on pharmacy participation rates was not available. We have concluded that comparable data on pharmacy participation over time is unlikely to be available in any state. Consequently, in Phase II we shall rather seek information on the number of pharmacies submitting claims or receiving payment in each month and use such information to proxy pharmacy participation.

TABLE 8-46

PER-UNIT MARKET SHARE, LIBRIUM AND DARVON
(in percent)

	Period				
	6	7	8	9	10
Librium					
5 MG CAPS	97.2%	93.6%	88.8%	70.6%	27.3%
10 MG CAPS	97.0	92.9	89.3	71.3	26.5
25 MG CAPS	96.5	92.5	91.2	71.8	24.6
Darvon					
65 MG CAPS	83.1	82.1	79.4	62.3	20.7
65 MG CMPD CAPS	95.0	94.7	94.7	80.0	24.3

8.3.8 Estimated Overall Impact of the MAC/EAC Program

Overall the MAC/EAC program has achieved a substantial savings in Massachusetts. The estimated minimum and maximum net savings attributable to the MAC/EAC program are shown in Tables 8-47 and 8-48. It was found that the program saved the state of Massachusetts between $688,479 and $1,185,400 during the 12 months ending March 1979, and should save the state between $1,276,766 and $2,248,150 during the 12 months ending March 1980--3.2 percent and 5.9 percent, respectively, of the total drug reimbursement expense in Massachusetts. A summary of the findings by major program component is presented below:

- MAC Products. The MAC program resulted in significant substitution of lower-priced generic products and cost savings to the state averaging at least $200,000 per year--between 12 and 14 percent of the total reimbursement cost (including fee) of the MAC products. However, cost savings were not achieved immediately because the state initially used a voluntary approach to the program. Substantial savings were obtained once this voluntary approach was abandoned. Even so, net savings are more limited than they otherwise would have been inasmuch as the state also adopted the MAC price limit for the lower-priced products of miscellaneous manfacturers and pharmacies are now claiming reimbursement at the higher MAC price level. This has resulted in slight overall increases in reimbursement cost for the MAC three anti-infectives, all of which had more than 50% of prescription claim volume accounted for by the miscellaneous manufacturers. Nearly 25 percent of propoxyhene HCL and chlordiazepoxide prescriptions were still being filled with the higher-priced brand. Thus, part of the savings is at least temporarily coming from pharmacy losses.

- EAC Products - The state's three-part EAC program has resulted in very considerable savings on reimbursement of ingredient cost, amounting to at least a million and a half dollars per year.

- Dispensing Fee - Although the dispensing fee was increased at time of EAC implementation, the fee had been unchanged for more than three years. Since the Rate Setting Commission increased its fee recommendation from $2.60 to $2.70 in response to testimony concerning the lower EAC reimbursement, the EAC program may well be responsible for the $0.10 difference--adding about half a million dollars per year to overall program costs.

- Administrative Costs - The costs associated with implementing and operating the MAC/EAC program have been quite small.

Manufacturers affected by the MAC program do not appear to have raised prices on other products within the same therapeutic category. That is, no evidence could be found for any price response to the MAC program by the manufacturers.

TABLE 8-47

Minimum Impact of MAC/EAC on Massachusetts Medicaid Program

	Savings (Costs) Attributed to MAC/EAC Program	
	April 1978-March 1979 (Actual)	April 1979-March 1980 (Projected)
MAC Products*	$166,976	$203,710
EAC: Direct Purchase Products	$275,911	$551,822
Volume Wholesale Purchase	$72,882	$145,764
AWP Less 5%	$436,110	$872,220
Dispensing Fee	($248,325)	($496,650)
Administrative: Implementation	($15,000)	—
Operation	($75)	($100)
Total	$688,479	$1,276,766

*If the state had not adopted the MAC price for the miscellaneous manufacturer's category, the projected annual savings would have been at least $67,052 larger.

TABLE 8-48

Overall Maximum Impact of MAC/EAC on Massachusetts Medicaid Program

	Savings (Costs) Attributed to MAC/EAC Program	
	April 1978-March 1979 (Actual)	April 1979-March 1980 (Projected)
MAC Products*	$194,964	$237,228
EAC: Direct Purchase Products	$275,911	$551,822
Volume Wholesale Purchase	$72,882	$145,764
AWP Less 5%	$656,718	$1,313,436
Dispensing Fee	—	—
Administrative: Implementation	($15,000)	—
Operation	($75)	($100)
Total	$1,185,400	$2,248,150

*If the state had not adopted the MAC price for the miscellaneous manufacturer's category, the projected annual savings would have been at least $67,052 larger.

8.4 Implications of the Pilot Study for Sample State Analyses in Phase II

The pilot study has clearly demonstrated the feasibility of compiling state claims data for use in evaluation of the MAC program. However, based on the pilot study, several items warrant careful consideration in analysis of the other sample states:

- Time Periods. The study time periods must be established in such a way as to avoid problems associated with claims payment delays due to end-of-year cash flow problems.
- Non-Tablet Unit Measures. Although Massachusetts had the same program administrator during the study period, there still was wide variability in the unit measures entered for non-tablet products. As a result, data for non-tablet products must be carefully reviewed before undertaking any projections.
- Implementation Procedures. One of the most significant factors for the MAC/EAC program appears to be the state's approach to implementation. As a result, the exact steps taken to implement, operate and modify the program must be clearly understood before analyzing the data.
- Linear Projection. A non-linear variable should be added to the regression model in order to track the trends with greater sensitivity.
- Manufacturer Analysis. This analysis was not particularly fruitful. As a result the manufacturer analysis in Phase II will utilize the IMS invoice level pricing data supplied to the Office of Pharmaceutical Reimbursement.
- Pharmacy Participation Analysis. Information should rather be sought on the trend in number of pharmacies submitting claims or receiving payment.

9.0 ECONOMETRIC ANALYSIS--A CROSS SECTION/TIME SERIES MODEL OF MEDICAID DRUG REIMBURSEMENT EXPERIENCE IN THE STATES

This section describes an econometric or multivariate methodology for using cross section/time series data from the states to model Medicaid drug reimbursement experience and to seek a statistical relationship between state drug reimbursement experience and the MAC-EAC and other drug program parameters in each state. Whereas the sample state analyses described in Section 8.0 will constitute the principal analytic thrust of the overall evaluation, the sample size for those more comprehensive analyses is rather small, only five states. Thus, it will be somewhat difficult to generalize from the sample state analyses to the entire nation. For this reason we are also proposing, as discussed herein, to use aggregate data on state drug reimbursement levels to model the impacts of the MAC-EAC program--using cross-section/time series econometric procedures to control for relevant drug program and demographic differences between the states. This model can then be used to estimate the aggregate cost savings from the MAC-EAC program. It can also be used to project the effects on cost of changing the program parameters, and will be a useful guide in generalizing from the sample state analyses to the nation as a whole.

The following variables of interest will be modeled empirically and related to MAC-EAC and other state drug program differences, controlling for other relevant differences (e.g., differences in the physician-population-ratio):

- average number of prescriptions per enrollee,
- average reimbursement per prescription,
- average ingredient cost per prescription,
- average dispensing fee, and
- administrative costs per prescription.

However, these variables are themselves inter-related and it is not possible to estimate reduced-form relationships for them without first specifiying the underlying structural (or simultaneous) model.[1] Furthermore, such a structural model must itself be estimated and favorably evaluated if the reduced-form relationships that derive from it are to have validity.

Much of the data for the econometric work will come from the on-going Survey of State Medicaid Drug Benefit Programs described in Section 7.0. The survey obtained the following kind of information on MAC-EAC and other relevant drug reimbursement parameters for a five-year interval, 1974-1978:

- status of EAC program
- status of MAC program
- basis for Estimated Acquisition Cost
- existence and extent of mini-MAC programs
- type/amount of dispensing fee
- formulary type
- other limitations on reimbursement (e.g., size or frequency of prescription)
- pharmacy participation rate
- administration costs

Recall that the survey instrument can be found in Appendix A. Other data for econometric modeling purposes, especially the drug reimbursement and Medicaid enrollment information, will come from existing Federal and other sources.

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[1] The structural form of a model is the set of behavioral relations--i.e., the ones derived from economic theory. The reduced form of a model is derived from the structural form and is the set of relations expressing the "equilibrium" impact of each exogenous variable on each of the variables being modeled, taking account of "feedback" or "multiplier" effects.

9.1 The Model

A multi-equation simultaneous system of equations is developed herein to seek a statistical relationship between MAC-EAC program parameters and drug reimbursement experience. The structural model given here encapsulates the key behavioral relationships. It broadly attempts to model supply and demand behavior with respect to the number of prescriptions per Medicaid enrollee. Nevertheless, the specification of any analytic model, especially a multi-equation model, is highly judgmental--part art and part science. For this reason, a variety of alternative specifications might conceivably be equally compelling. Furthermore, any model must necessarily abstract from reality if it is to provide a useful and estimable description of it. Thus, many of the assumptions implicit in the specifications below are approximations of what is true, reflecting our judgement that certain relationships are more important than others given the data and other resource constraints of this study.

In any event, the model below indicates four key behavior relations generally represented as follows:

The Demand Function

(9-1) $RX/ENR = f_1(P_N, P_R, PhPR, \%PART, ELIG, AGE, \%MALE, \%URBAN, Q_{MD}, LIM, FORM, PRIOR)$

The Inverse Supply Function

(9-2) $P_R = f_2(RX/ENR, \%POP, MAC, MINIMAC, EAC, FEETYPE, FORM, LIM, PRIOR, SUB, AD, TECH, \%URBAN, \%CHAIN, WAGE, AGE, \%MALE, ELIG)$

The Pharmacy Participation Rate Function

$$(9\text{-}3)\quad \%PART = f_3(RX/ENR,\ \%POP,\ P_R,\ MAC,\ MINIMAC,\ FORM,\ LIM,\ PRIOR,\ SUB,\ AD,\ TECH,\ PhPR,\ \%URBAN,\ \%CHAIN,\ WAGE,\ ADMIN/RX,\ AGE,\ \%MALE,\ ELIG)$$

The Administrative Cost Function

$$(9\text{-}4)\quad ADMIN/RX = f_4(ENR,\ RX/ENR,\ MAC,\ MINIMAC,\ EAC,\ FEETYPE,\ \%PART,\ PhPR,\ LIM,\ FORM,\ PRIOR,\ ELIG,\ WAGE,\ AGENT,\ MIS)$$

where RX/ENR is the average number of prescriptions per Medicaid enrollee,

P_N is the copayment amount, if any, or net price to the Medicaid recipient,

P_R is the average reimbursement price--average reimbursement per prescription,

PhPR is the pharmacy-population-ratio in the state —e.g., number of pharmacies per 10,000 population,

%PART is the percentage pharmacy participation rate in the Medicaid program,

ELIG is a vector of variables giving the distribution of state Medicaid enrollment by eligibility category (e.g., percent AFDC, percent disabled and percent medically indigent)

AGE is a vector of variables giving the age distribution of Medicaid enrollees--under 6, 6-20, 21-64 and 65 and over,

%MALE is the percentage male composition of the Medicaid population,

%URBAN is the percentage of total state population living in urban areas,

Q_{MD} is the average amount of Medicaid reimbursement for physicians' services, LIM is a vector of variables describing prescription size and frequency limits,

FORM is a vector of variables indicating the existence and type of formulary,

PRIOR is a vector of variables describing any prior authorization requirements or provisions,

%POP is the percentage of the total state population enrolled in the Medicaid program,

MAC is a variable or set of variables indicating MAC implementation in the state,

MINIMAC is a variable indicating the existence and extent of state "mini-MAC" programs,

EAC is a vector of variables indicating the basis for acquisition cost (e.g., AWP or the decile level for actual prices),

FEETYPE is a vector of variables indicating the type of dispensing fee (e.g., flat, variable or mark-up),

SUB is a vector indicating existence of anti-substitution legislation,

AD is a variable indicating restrictions on advertising,

TECH is a variable indicating whether or not the use of technicians is permitted in filling prescriptions,

%CHAIN is the percentage of pharmacies in the state owned by a chain,

WAGE is the average per capita income in the state (a proxy for the wage level),

ADMIN/RX is the average cost to the state per prescription of administering the drug reimbursement program,

ENR is the total number enrolled in the Medicaid program,

AGENT is a variable indicating whether or not the state is the fiscal intermediary, and

MIS is a variable indicating the sophistication of the management information system (e.g., computerized or not).

Analytically, the above set of equations is a simultaneous-equations set because the dependent variables--RX/ENR, P_R, %PART, and ADMIN/RX--are endogenously determined. That is, each of these variables is either directly or indirectly a reciprocal function of the other dependent variables. For example, RX/ENR is a function of P_R, and P_R is a function of RX/ENR. If identified, such a simultaneous-equations system can be estimated by multi-equation techniques. However consider now the specifications for each of the system equations and the rationales for hypothesizing the indicated relationships.

9.1.1 The Demand Function

The relation in (9-1) models the average number or quantity of Medicaid-reimbursed prescriptions demanded per Medicaid enrollee (RX/ENR).[1] As usual, demand is hypothesized to be inversely related to the consumer's net price, in this case the copayment amount (P_N).[2] However, the average reimbursement per prescription is also included as a total price variable (P_R).

This variable reflects the magnitude of the financial incentive to seek out a pharmacist that accepts Medicaid reimbursement. That is, the higher the price, the less likely is a Medicaid-eligible to pay for a prescription out-of-pocket, in which case it would not be measured in the Medicaid quantity variable (RX/ENR). A positive coefficient is thereupon hypothesized for this price-like endogenous variable, inasmuch as it proxies the price to the consumer of the non-Medicaid substitute.

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[1] The percentage of Medicaid enrollees receiving one or more prescriptions in a given year--i.e., the participation rate--could also be modeled from the same basic relation.

[2] Of course, the copayment is zero in many states.

The pharmacy-population-ratio (PhPR) is assumed to proxy consumer "access" to a pharmacy. Someone is less likely to have a prescription filled if it is inconvenient to do so. Thus, we predict a positive coefficient. The percentage urban variable (%URBAN) serves a similar function and is likewise hypothesized to have a positive coefficient. The percentage of pharmacies accepting Medicaid reimbursement (%PART) measures another dimension of access. Ceteris paribus, the higher the pharmacy participation rate, the easier it is to find a pharmacist that accepts Medicaid reimbursement and the less likely it is that a Medicaid-eligible will pay for a prescription out-of-pocket.

The age distribution (AGE) and sex (%MALE) variables are included to control for such demographic-related differences in the "need" and demand for prescription drugs. Children, the elderly and women are hypothesized to have greater demands. The Medicaid-eligibility distribution is included for similar purpose--e.g., the disabled are likely to have a greater demand for drugs.

The average Medicaid reimbursement per enrollee for physicians' services (Q_{MD}) is assumed to proxy the quantity of physicians' services received--i.e., the number of physician visits--and thereupon the likelihood that prescriptions will be written. It is not our purpose here to explain physician utilization. It can be taken as being exogenous. We assume that, on average, medication and physician visits are complements and thereupon predict a positive relation between RX/ENR and Q_{MD}.

The prescription limitation and formulary variables--LIM and FORM, respectively--describe (exogenous) program constraints on the extent and scope of demand for Medicaid-reimbursable prescriptions. The more restrictive the formulary and the lower the limit, if any, on the number of prescriptions, the lower will be the number of Medicaid prescriptions that can be demanded. On the other hand, other things equal, the lower the limit on prescription size, the greater must be the number of prescriptions demanded to achieve the same therapy level.

Prior authorization provisions (PRIOR) can be expected to mitigate the effects of respective formulary and prescription limitations. The coefficients should therefore be smaller in absolute value but opposite in sign.

9.1.2 The Inverse Supply Function

The average reimbursement equation in (9-2) is formally an inverse supply function. That is to say, it expresses the "supply" price--equal to average reimbursement (P_R)--as a function of the quantity supplied--both the number of prescriptions per Medicaid enrollee (RX/ENR) and the number of Medicaid enrollees as a percent of the total population (%POP).

As usual, it is hypothesized that the supply price varies directly with the quantity-supplied--i.e., it varies directly with both RX/ENR and %POP. In general, we shall assume that the average reimbursement price (P_R) is determined as the composite of factors affecting product acquisition cost and dispensing costs.

The MAC, MINIMAC and EAC variables are included to test for the expected cost-controlling effects of the MAC and MAC-like programs. Other things being held constant, it is hypothesized that the MAC and mini-MAC programs reduce average reimbursement per prescription. A lower basis for estimating the acquisition cost of ingredients is likewise hypothesized to reduce reimbursement. The FEETYPE variables are included to test whether or not the increase the cost to the pharmacist, either in terms of the time taken to assure compliance with these provisions or in terms of reimbursement being denied retrospectively. However, in addition, these variables reflect systematic differences in the type and size of prescription. For example, a limitation on prescription size can be expected to vary inversely with the reimbursement price. A priori, we suspect that such effects will dominate. A variable indicating the existence of anti-substitution legislation (SUB) may be used to test for increased substitution of lower-priced generic alternatives in states without such legislation. States having such laws are thercupon predicted to have higher average reimbursement levels.

Ceteris paribus, we assume that prices are lower in a more competitive market. The variable indicating the existence of restrictions on advertising (AD) is included for this reason. It is hypothesized that reimbursement is lower in states without such restrictions.[1]

The WAGE variable--actually proxied by per capita income--is assumed to proxy regional variation in the labor costs of dispensing drugs. Thus, we anticipate that mean reimbursement varies directly with WAGE. The %URBAN variables may reflect the greater potential for economies of scale in more dense areas--i.e., the volume per pharmacy tends to be larger. Likewise, the %CHAIN variable may reflect economies of scale due to having multiple stores. Thus, we predict negative coefficients for both. Furthermore, we anticipate that dispensing costs will be lower in states that approve the use of technicians (TECH) in filling prescriptions.

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[1] John F. Cady (1975) has found such a relationship from 1970 cross-sectional analysis of inter-state variation in prescription prices.

The AGE, %MALE and ELIG variables are merely included to control for potential differences in the type of prescriptions dispensed to the various demographic and Medicaid-eligibility groups. No specific hypotheses are given.

Although the manner in which the reimbursement price-level (P_R) is determined (or formed) should be irrelevant to pharmacy supply behavior, it will also be interesting to model the dispensing fee (FEE) and average ingredient cost (INGRED) components as determined or at least implied by the state reimbursement policies. First of all, we have by definition that:

$$P_R = \text{FEE} + \text{INGRED} + \text{COPAY (if any)} \tag{9-5}$$

Consequently, the reimbursement relation can be arbitrarily decomposed into separate relations for FEE and INGRED as long as these variables are also reciprocal functions of one another. However, let us specify the relations as if they were behavioral relations for the "true" dispensing and ingredient cost levels. If FEE and INGRED do not in fact fairly reflect their conceptual counter parts we should expect to find a significant relationship between the two variables. This would also mean that a MAC-related reduction in the basis for ingredient cost determination could be expected to lead to an increase in the dispensing fee levels. We suggest the following relations:

$$\text{FEE} = f_5\,(\text{INGRED, RX/ENR, \%POP, EAC, FORM, LIM, \%CHAIN, PRIOR, TECH, AD, WAGE, ADMIN/RX}) \tag{9-6}$$

$$\text{INGRED} = f_6\,(\text{FEE, MAC, MINIMAC, FEETYPE, FORM, LIM, PRIOR, SUB, \%URBAN, \%CHAIN, AGE, \%MALE, ELIG}) \tag{9-7}$$

The simultaneous-equations set will also be estimated to reflect this decomposition. The hypotheses are the same.

9.1.3 The Pharmacy Participation Rate Function

The pharmacy participation rate (%PART) can be viewed as being a supply-type relationship in the sense that it gives the percentage of pharmacies willing to supply Medicaid prescriptions at the prevailing reimbursement price (P_R). Thus, a direct relationship betweeen %PART and P_R is hypothesized. The specification is, with some exception, similar to that for the P_R-relation and hypotheses for the variables included are the same. In addition, we hypothesize that pharmacy costs are lower, ceteris paribus, in those states having higher drug administration costs (ADMIN/RX). This assumes that state program costs substitute in some degree for program costs (e.g., claims processing) imposed on the pharmacy itself. Thus, we hypothesize a positive relation between %PART and ADMIN/RX.

9.1.4 The Administrative Cost Function

This is a more ad hoc-type relationship. We hypothesize that the per-prescription cost varies inversely with the total number of Medicaid enrollees (ENR) and the number of prescriptions per enrollee (RX/ENR) due to economies of scale. The same is true with respect to the pharmacy participation rate (%PART). However, other things equal, the per unit administrative costs are hypothesized to be higher the relatively greater is the number of pharmacies in the state, as proxied by PhPR. Costs could also be expected to be higher in states having higher wage (WAGE) levels. Also, a more sophisticated management information system (MIS) is likely to be costly. States having more elaborate reimbursement controls--as proxied by MAC, MINIMAC, EAC, FEETYPE, LIM, FORM AND ELIG--might also have differential costs. We control for the use of a fiscal agent (AGENT) but indicate no hypothesis for this variable.

9.2 Estimation

The structural model will be estimated using the two-stage-least-squares procedure. This is done primarily to validate the overall model--i.e., to demonstrate that the structural specification is an analytically meaningful one. However, it will be more relevant for policy purposes to estimate and examine the reduced-form equations using the ordinary-least-squares procedure. All endogenous variables are omitted in estimating reduced-form relations. Formally, these equations are derived from the structural equations by solving for each of the endogenous variables so as to eliminate other endogenous variables from the right-hand side. This is accomplished in much the same way that n linear relations are used to solve for n unknowns, except that the unknowns remain a function of the exogenous variables. The reduced-form equations generally give the more policy-relevant information because reduced-form coefficients give the equilibrium impact of a change in any exogenous variables on any endogenous variable. For example, the MAC coefficient in the reimbursement price (P_R) relation reflects not only the direct impact on reimbursement but also its effect on other endogenous variables and their effect on "price". That is, it reflects not only the direct effect of MAC on P_R but also its impacts on %PART and ADMIN/RX and their impact on P_R. However, because of such "feedback" effects, it is difficult to gauge whether or not reduced-form results are consistent with expectations. This is more readily done in the context of the structural relations.

However, simultaneity is not the only statistical problem that the analysis confronts. As is usual in cross section/time series data we have reason to hypothesize the existence of serial autocorelation. That is, the regression residuals for each state are likely to be correlated across time. This happens because the model itself it incomplete. Whereas we will have extensive information on state reimbursement policies, it is nevertheless likely that some relevant differences between the states in this regard have not been captured in the model, and perhaps can not be. Formally, such factors are omitted variables. Although a well-specified model lessens the severity of this serial autocorrelation problem, it can rarely be solved by giving attention to specification alone. The alternative is to use an econometric procedure that takes account of it. We propose to use the "fixed effects" procedure due to Mundlak. This procedure essentially incorporates a dummy variable for each of the states except one to pick up the unobserved/ unmeasured differences between states. This necessarily assumes that these "state effects" are fixed and do not vary over time. This procedure can be used with two-stage-least-squares.

While the adjustment for autocorrelation should give much more dependable and precise estimates for the MAC and EAC variables, inasmuch as these variables will have relatively great covariance over time, it will at the same time severely restrict the efficiency of estimation for some other variables. The potential sample size is 240--48 states times five years. Nevertheless, missing data is likely to be a problem. Thus, realistically, the effective sample size for systems estimation may be somewhat smaller. A relatively large number of potential independent variables were indicated in Section 9.1 and the adjustment for autocorrelation would effectively add 47 more variables. Thus, for the sake of greater efficiency, it will be highly desirable to reduce the number of independent variables in the model. One alternative is to simple remove highly insignificant variables from the model. Whereas such strictly empirical strategies are not generally recommended one oftentimes has no alternative (see Wonnacott and Wonnacott, p. 312).

9.3 Conclusion

The econometric modeled developed here is perhaps too ambitious.[1] Yet it is better to attempt too much than to attempt too little. In any event the econometric strategy shall remain flexible subject to the exigencies of circumstance.

As is oftentimes true in econometric modeling, one does not always have the "ideal" data set for estimating the model. That will most certainly be the case for this study. Some variables will have been measured imperfectly (e.g., Medicaid enrollment, the pharmacy participation rate, and the administrative cost) and others may not have been measured at all (e.g., the actual prescription size) and must be proxied or controlled indirectly--e.g., controlling for difference in prescription size by including characteristics of the Medicaid-eligible population and by using the fixed effects model. In estimating a model, one must remain sensitive to such empirical problems and indicate appropriate caveats in interpreting the results. Although improper inference from analysis is always a possibility, this risk must be weighed against the potential benefits of analysis. In any event, the econometric study proposed herein should not be viewed as being definitive. It is merely a "first-generation" model and no doubt the state-of-the-art in this area can be pushed much further, resources permitting.

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[1] For example, we have serious reservations about the reliability and utility of the pharmacy-participation-rate information elicited in the survey. Almost no variation is indicated across years.

Finally, it should be said that it would not be too surprising to find from analysis of aggregate reimbursement data that the MAC portion of the MAC-EAC program has had no effect to date. Only a handful of MACs were promulgated and implemented during the 1974-1978 interval examined by this study. The hypothesized cost-decreasing effect of these MACs may well have been swamped by uncontrolled or stochastic variation in state reimbursement experience. The sample state analyses will give a much more reliable indication of the cost-savings due to the early MACs. On the other hand, the econometric study should give a much more dependable estimate of the cost-savings potential due to alternative bases for establishing reimbursement of ingredient cost--i.e., the EAC portion of the MAC-EAC program.

10.0 PRELIMINARY ASSESSMENT AND PHASE II PROSPECTS

It would surely be premature and irresponsible to draw any firm conclusions about the merits of the MAC-EAC program based on the results of pilot study analysis in a single state. On the other hand, it would also be irresponsible and foolish, given the present intense controversy surrounding the program, to altogether dismiss the pilot study analysis as being merely a test of the sample state methodology. Although some changes in the sample state methodology are suggested by the pilot study experience, these refinements do not materially affect the validity of results reported herein from the Massachusetts pilot study. The following can be indicated as tentative conclusions:

(A) There should no longer be much doubt about the cost-savings potential of the MAC program. The fledgling first-efforts of the MAC program are clearly shown to have saved substantial amounts in Massachusetts and we have no reason to believe that experience elsewhere will be any different.

(B) A comparatively stringent EAC has been implemented in Massachusetts and is shown to have achieved a very sizeable savings on reimbursement of ingredient cost. However, the extent of impact on the dispensing fee level and pharmacy participation rate is less certain. EAC implementation has not been similarly aggressive in many other states and the cost savings estimates for Massachusetts cannot be readily generalized to the nation.

Although the basic cost-savings concerns are by no means resolved--and this study will continue giving attention to them--we believe that continuing discussions of the MAC-EAC program might focus more fruitfully on the potential externalities, e.g., the potential downstream impact of diminished industry profit levels on R&D activity and new drug development.

As noted elsewhere, in Phase II of this study data from four additional sample states will be acquired and analyzed. The four additional states are:

- Arkansas
- Maine
- Minnesota
- Tennessee

These states have already expressed a willingness to participate in the study and preliminary site visits have confirmed the availability of appropriate data. Also in Phase II, the data reported herein from the Survey of Medicaid Drug Programs will be used for tabular and cross-section/time-series econometric analysis purposes. These analyses should be helpful in generalizing the sample state results to the nation. Finally, the results from all analyses, as well as information available from other sources, will be integrated into a benefit/cost framework to give an overall assessment of the MAC-EAC program. The financial "benefits" and "costs" to the Medicaid program will have been measured quantitatively in five states and estimates given for the cost savings to the government in all states, both an estimate of the actual savings and a projection of the potential savings if all the states were to have some preferred mix of program parameters. Other potential benefits and costs may not have been measured in pecuniary terms or may have been measured only qualitatively--i.e., the direction of impact determined but not the actual magnitude. These data can nevertheless be displayed in cross-tabular format and cost savings weighed against any nonpecuniary or qualitative findings of either adverse or beneficial consequences--to the drug industry, to the government patient, to the private patient, to the doctor, or to the pharmacist. Of course, not all potential social impacts of the MAC-EAC program will have been monitored in any fashion by the evaluation. Such prospects will be acknowledged. Also, recommendations for exploring the longer-run consequences will be indicated.

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APPENDICIES

APPENDIX A

SURVEY INSTRUMENT

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

As part of the overall effort to design and implement an evaluation of the maximum allowable cost (MAC) program, it is first necessary to collect selected information on state Medicaid drug benefit programs. To the extent possible, this information will be abstracted from secondary data sources available to the federal government. The next page indicates the data format to be used to abstract this information. Following that is the instrument to be used in interviewing state Medicaid pharmacy consultants. It gathers that information not available from federal sources. The instrument begins with a statement explaining the nature of the project and the kinds of information sought. It then moves to the specific questions. Complete directions are given for administering the instrument.

DATA SHEETS ON MEDICAID DRUG BENEFIT PROGRAMS

(Federally Available Information)

STATE________________

PROGRAM INITIATED ___/___/___

DRUG PROGRAM INITIATED ___/___/___

	Fiscal Year									
	1974		1975		1976		1977		1978	
MEDICAID BENEFIT PAYMENTS										
. Total Program										
. Drug Program (Outpatient Only)										
NUMBER OF PRESCRIPTIONS										
ANNUAL NUMBER OF UNDUPLICATED RECIPIENTS										
MEDICAID ADMINISTRATIVE COSTS (TOTAL)										
ELIGIBILITY FOR DRUG COVERAGE	yes	no	yes	no	yes	no	yes	no	yes	no
. Categorically Needy	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
. Medically Needy	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
. Other (Specify):__________	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
MAJOR CHANGES IN ELIGIBILITY (Please Decribe)										

MMIS STATUS: CURRENT STATUS__________

DATE OF CERTIFICATION___/___/___

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

INSTRUCTIONS TO INTERVIEWER

Each interviewer will be provided with the names and telephone number of the pharmacy consultants to talk with. In those cases, when the person listed is no longer in that position, it is, of course, appropriate to determine who the current consultant is and to interview him or her. If the person to be contacted is not available at the time of the call, please schedule a firm date and time to carry out the interview. If a pharmacy consultant will not cooperate, simply thank him or her and proceed to the next person on the list. You should, however, report all such instances to the person in charge of the survey.

This survey instrument provides you with complete information on how the interview should be conducted. All instructions to you are in all capital letters and placed in parentheses. The questions themselves are written for ease of delivery and to maintain a continuous flow during the interview. You should understand that in many cases the questions are historical in nature and that data are being gathered for a five-year period. Each year must be covered for each question. Often, however, there will not have been any changes from year-to-year. This should make the interview proceed more quickly than might otherwise be apparent. Nevertheless, be sure to cover all five years.

In those cases where the respondent does not know the answer, but refers to a document, make a note and request the document at the end of the interview. If the respondent does not know the answer to a specific question, but refers you to another person, you are to get the telephone number and complete the interview by contacting that person. The pharmacy consultant's referral should be used in introducing yourself to this second respondent.

The interview begins with a brief introductory statement that may be found on the next page. This statement should be read to each respondent.

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

INTRODUCTORY STATEMENT

(THE FOLLOWING STATEMENT SHOULD BE USED TO BEGIN THE INTERVIEW.)

Hello, I'm ______________________________ with Pracon Incorporated, a health care consulting firm in Washington, D. C. We are working with Abt Associates and the Office of Research in the Health Care Financing Administration, DHEW, on an evaluation of the MAC program. The purpose of this call is to gather specific information on your drug benefit program. We are interested in the current configuration of the program, as well as the operation of the program over the last five (5) years.

We are compiling these data on all state programs. The information will be used for several purposes:

- To prepare a comprehensive profile of MAC and EAC in the states;
- To provide a data base for the economic analysis of the program, examining Medicaid drug benefit programs before and after the implementation of MAC; and
- To assist the evaluation study group in the selection of states for further in-depth analysis.

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

We expect the interview to take between 30 and 45 minutes. Can we do the interview now or may I schedule a more convenient time to talk with you.

(INTERVIEWER SHOULD ENTER THE TIME AND DATE HERE: ______________________________.)

(IF THE INTERVIEWEE INDICATES HE OR SHE IS READY NOW, PROCEED TO THE NEXT PARAGRAPH.)

Before beginning, I should note that the completed interview form will be sent to you so that you may check it for accuracy and add information that you may not have immediately available. In addition, we will prepare a summary of the results from all the states and send this to you.

(INTERVIEWER SHOULD NOW TURN TO THE NEXT PAGE AND BEGIN THE QUESTIONS.)

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State________________

Date____/____/____

REIMBURSEMENT FOR PRESCRIPTION DRUGS

Ingredient Cost/EAC Method

Interviewer: I would first like to ask about the method your program has used and now uses for setting reimbursement rates for drugs, both before and since the EAC regulations.

1. During (NAME EACH YEAR IN SEQUENCE) did the program use (READ LIST AND CHECK 'YES' OR 'NO' FOR EACH ITEM):

	Fiscal Year									
	1974		1975		1976		1977		1978	
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
a.. AWP	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
b.. AWP Prices Less Discount	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
c.. Wholesaler Supplied Prices	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
d.. Direct Prices - Selected Products	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
e.. Quantity Prices - Selected Products	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
f.. Federal Decile Prices	▨	▨	▨	▨	☐	☐	☐	☐	☐	☐
- What Decile Used?	▨	▨	▨	▨	______		______		______	
g.. Other (please describe)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

	Fiscal Year									
	1974		1975		1976		1977		1978	
. Were there or are there exceptions to the method used? Could you describe those exceptions year-by-year?										
Dispensing Fee										
Interviewer: Next, I would like to cover the dispensing fee used by your program. (ASK 3 AND 4 AS A UNIT FOR EACH YEAR)										
3. Can you tell me what the dispensing fee was/is for (NAME EACH YEAR IN SEQUENCE)?	$______		$______		$______		$______		$______	
4. Was/is the fee: (READ LIST AND CHECK YES OR NO FOR EACH ITEM)	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
a.. A flat fee for all prescriptions?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
b.. A variable fee for level of services provided? (IF YES, ASK FOR A COMPLETE DESCRIPTION OF THE DIFFERENT FEES AND ENTER.)	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
c.. A percentage mark-up? (IF YES, ASK FOR THE PERCENTAGE AND ENTER.)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
d..	______%		______%		______%		______%		______%	

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State ____________

Date __/__/__

Other Restrictions

5. **Interviewer:** During (YEAR) are/were there other restrictions on the amount paid for prescription drugs, such as the lesser of usual and customary charges or calculated prices? (IF YES, ASK) Could you describe those other restrictions?

Fiscal Year									
1974		1975		1976		1977		1978	
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

MAC Program

Interviewer: I would now like to find out about the MAC program in your state.

6. Could you tell me the date that the federal MAC program was implemented in your state? __/__/__

7. Before the federal MAC came into being, did your state have its own maximum allowable cost program? YES ☐ NO ☐

8. When was the program implemented? __/__/__

9. Could you tell me what products were covered year-by-year? (IF THE LIST IS EXTENSIVE, ASK IF A COPY OF THE LIST IS AVAILABLE FOR THE APPROPRIATE YEARS AND WOULD HE OR SHE SEND IT TO YOU.)

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State______________

Date___/___/___

	YES	NO
10. Has your state repealed its anti-substitution legislation?	☐	☐
11. What was (is) the effective date of the repeal?	___/___/___	
12. What kind of substitution regulation is currently in force? (READ LIST AND CHECK YES OR NO FOR EACH CATEGORY.)		
a.. Postive formulary-listing of drugs which the pharmacist may substitute.	☐	☐
b.. Negative formulary-listing of drugs which pharmacist may not substitute.	☐	☐
c.. Physician approval of substitution requested.	☐	☐
d.. Substitution allowed unless physician forbids it.	☐	☐
e.. Other (PLEASE DESCRIBE):		
. Did your state have an anti-substitution law after MAC was implemented? (IF NO, SKIP TO QUESTION 15.)	☐	☐

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State________

Date___/___/___

	Fiscal Year				
	1974	1975	1976	1977	1978
14. Can you describe the administrative mechanism that allows or allowed pharmacy substitution under MAC without physician authorization?					
15. Are there data available on the number of physician overrides of MAC products in (YEAR)?			YES ☐ NO ☐	YES ☐ NO ☐	YES ☐ NO ☐
Other Payment Limitation					
Interviewer: I would now like to ask you about several other kinds of payment limitations that you may have in your drug program.					
16. Dollar Limits (ASK A-C AS A UNIT BY YEAR)					
a.. During (YEAR) were/are there dollar limits on the amount that can be spent on prescription drugs per month? (IF YES, ASK B AND C BEFORE GOING TO NEXT YEAR. IF NO, PROCEED TO QUESTION 17)	YES ☐ NO ☐	YES ☐ NO ☐	YES ☐ NO ☐	YES ☐ NO ☐	YES ☐ NO ☐
b.. When was this implemented?	___/___/___				
c.. What was, and is, the dollar limit?	$______	$______	$______	$______	$______

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State__________________

Date___/___/___

	Fiscal Year									
	1974		1975		1976		1977		1978	
. Limits on Size of Prescriptions	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
17.. Are there or have there been limits on the size of prescriptions based on drug therapy? (IF NO, PROCEED TO NEXT SET OF QUESTIONS, "COPAYMENTS".)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
18.. When were these implemented? (ENTER DATE) Are they still in force? (IF NOT, ENTER DATE) .. Could you describe the limits? (IF THIS LIST IS EXTENSIVE, ASK FOR A COPY OF THE CONTROLS COVERING THE APPROPRIATE YEARS.)			Began __/__/__				Ended __/__/__			
. Copayments										
20.. Does, or did, your program have a copayment for drugs? (IF NO, PROCEED TO NEXT SET OF QUESTIONS, "FORMULARY".)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
21.. When was this implemented? (ENTER DATE) Are they still in force? (IF NOT, ENTER DATE)			Began __/__/__				Ended __/__/__			
22.. What was, and is, the copayment amount?	$______		$______		$______		$______		$______	
. Formulary										
23.. Did your drug program have a formulary in 1974, 1975, 1976, 1977, and does it have one now? (IF NO FOR ALL YEARS, PROCEED TO QUESTION 27)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
24.. When was the formulary implemented?	___/___/___									

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State____________

Date__/__/__

	Fiscal Year				
	1974	1975	1976	1977	1978
25.. Approximately how many drug items are on the formulary?	____	____	____	____	____
26.. Could you describe the nature of the formulary? (CHECK ONE)	YES NO	YES NO	YES NO	YES NO	YES NO
a - Open?	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
b - Closed?	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
c - Other Comments?					

. Limit on Number of Prescriptions Per Month

27.. Were there or are there limits on the number of prescriptions a beneficiary may have in a month? (IF NO, PROCEED TO THE "PRIOR AUTHORIZATION" QUESTIONS.)	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
28.. When were these limits implemented? (ENTER DATE) Are they still in force? (IF NOT, ENTER DATE.)		Began __/__/__		Ended __/__/__	
29.. What was (is) the limit?	____	____	____	____	____
30.. What were (are) the exceptions to this limit?					

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State________________

Date____/____/____

	Fiscal Year									
	1974		1975		1976		1977		1978	
Prior Authorization	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
31.. Did (does) the program require prior authorization for drugs under certain circumstances?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
32.. When was prior authorization implemented? (ENTER DATE) Are these still in effect? (IF NOT, ENTER END DATE)	Began ___/___/___				End ___/___/___					
33.. When was (is) prior authorization applicable? (CHECK ONE OR MORE.)										
a - Drugs not on the formulary?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
b - When dollar limit is exceeded?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
c - When number of prescriptions exceeded?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
d - Other? (Please describe)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

34.. Who is responsible for approving authorization requests?

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State________

Date___/___/___

DRUG PROGRAM ADMINISTRATIVE COSTS

Interviewer: I would now like to ask you about the costs of administrating the benefit program.

	Fiscal Year				
	1974	1975	1976	1977	1978
	YES NO	YES NO	YES NO	YES NO	YES NO
35. First, is it possible to identify separately the administrative costs of the drug program?	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
36. If so, what are those costs per year?	$______	$______	$______	$______	$______
37. Has there been, or is there now, a fiscal agent for the drug benefit program?	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
38. Who was (is) the fiscal agent?	______	______	______	______	______
39. What was the amount of the contract with the fiscal agent?	$______	$______	$______	$______	$______

PHARMACY PARTICIPATION

Interviewer: I have two questions I'd like to ask about pharmacy participation.

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State________________

Date___/___/___

	Fiscal Year									
(ASK 40-42 AS A UNIT FOR EACH YEAR.)	1974		1975		1976		1977		1978	
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
40. During (YEAR) how many pharmacies participated in the program?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
41. Can you give us the yearly average?	_____		_____		_____		_____		_____	
42. What was/is the total number of pharmacies in the state in (YEAR)?	_____		_____		_____		_____		_____	

DATA AVAILABILITY

Interviewer: I would like to ask you several questions about the data you have available on the drug program for the years 1974 through 1978.

	1974		1975		1976		1977		1978	
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
43. Does the program prepare a "Drug Usage Frequency Analysis" that lists number of Rx's and $ expenditures by individual products grouped by therapeutic categories (similar to Output No. MR-0-21 in MARS)?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
44. If yes, is the report available:										
a.. Annually?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
b.. Quarterly?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
c.. Monthly?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State________________

Date____/____/____

	Fiscal Year									
	1974		1975		1976		1977		1978	
45. Do you know what the storage medium is:	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
a.. Paper?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
b.. Micro-film or Fiche?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
c.. Other (Please specify)?										
46. Are claims data available?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
47. Have there been changes in product codes?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
a.. If so, could you describe the changes? (THE INTERVIEWER SHOULD NOTE BOTH THE OLD AND NEW CODES AND THE DATES OF THE CHANGES.)										

OTHER INFORMATION

(THE INTERVIEWER WILL THEN ASK SEVERAL QUESTIONS ABOUT PROGRAM FORMS.)

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State________________

Date___/___/___

Interviewer: Could you please send a copy of:	YES	NO
48. Drug claim form?	☐	☐
49. Sample of Drug Usage Frequency Analysis Report?	☐	☐
50. General information on the program that is forwarded to participating pharmacies?	☐	☐
51. Could you also send me the reports/other documentation you mentioned earlier in the interview. (THIS WILL INCLUDE SUCH THINGS AS A LIST OF DRUGS COVERED UNDER A STATE MAC, RULES AND REGULATIONS, OR STUDIES ON THE PROGRAM. THE INTERVIEWER SHOULD BRIEFLY REVIEW THE INSTRUMENT TO CHECK FOR OTHER NEEDED DOCUMENTATION MENTIONED BY THE PHARMACY CONSULTANT.)	☐	☐

CLOSING

Interviewer: Thank you very much for your cooperation. As I suggested at the beginning of the interview, we will send you the completed form for your review. When you receive the form, we would greatly appreciate your answering those questions that were not available during the interview. I should also note that a summary of all the states will be developed, and

State________________

Date____/____/____

we will send this to you. To make sure the information reaches you, may I have your current address and title. (INTERVIEWER WILL NOTE NAME, ADDRESS, AND TITLE IN THE FOLLOWING SPACE.)

Name ______________________________

Title ______________________________

Address ______________________________

____

____

____

____

Again, thank you for your help.

APPENDIX B

SURVEY OF MEDICAID DRUG PROGRAMS--STATE SUMMARY

The following tables contain summary information on each state included in the survey. The summary provides information yearly from 1974 through 1978 on the following items:

- Monthly drug expenditures per recipient.
- Monthly number of prescriptions per recipient.
- Average prescription price.
- Dispensing fee - including whether flat, variable or a percentage mark-up and the amount of the fee each year.
- Ingredient cost - including what kind of reimbursement levels were used.
- Program restrictions - including whether the formulary was open or closed, status of substitution, number of prescription limit, dollar limit, size limit, prior authorization requirement, existence of a state MAC program and existence of co-payment and its amount.

The states of Alaska, Arizona, Hawaii and Wyoming are not included in the state summary. Arizona and Wyoming did not have Medicaid drug programs.

STATE SUMMARY

State: ALABAMA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$9.33	$8.22	$10.00	$10.40	
Rx Per Recipient	--	2.2	1.8	1.8	--	
Avg Rx Price	$3.80	$4.34	$4.51	$5.47	--	
DISPENSING FEE						
Flat						
Variable	X	X	X	X	X	Due to exceptions
Amount						
< $2.00	1.90	1.90	1.90			
$2.00-$2.50				2.25	2.25	$1.80 nursing homes
$2.51-$3.00						†$1.20 st hospitals
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod				X	X	
Quan Price/Select Prod						
Federal Decile						Use only as ref.
Decile						
Other	AAC	AAC	AAC			
Usual and Customary				X	X	As of Oct. 1977
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	†Based on Ala. Drug Index Code
Closed						
Anti-substitution	X	X	X	X	X	Plan to repeal
Limit on No. of Rxs						
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	
State MAC						
Co-payment		X	X	X	X	
Amount		.50	.50	.50	.50	

STATE SUMMARY

State: ARKANSAS

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$10.66	$9.80	$11.33	$12.78	
Rx Per Recipient	--	--	1.7	1.7	--	
Avg Rx Price	$5.40	--	$5.64	$6.57	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.00	2.00	2.00			
$2.51-$3.00				2.70	2.87	
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X					Repealed 1975
Limit on No. of Rxs			3	3	4	
Dollar Limit						
Size Limit			X	X	X	30 day maximum
Prior Authorization						
State MAC			X	X	X	Established 1976
Co-payment	X	X	X	X	X	
Amount	.50	.50	.50	.50	.50	

STATE SUMMARY

State: CALIFORNIA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$8.77	$9.80	$9.96	$9.42	
Rx Per Recipient	--	1.4	1.5	--	--	
Avg Rx Price	$5.80	$6.18	$6.67	--	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.42					
$2.51-$3.00		2.70	2.86			
> $3.00				3.06	3.06	Interim fee: 1977-78
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	1977 EAC*
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod				X	X	
Quan Price/Select Prod				X	X	
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						1966 closed formulary
Open						
Closed	X	X	X	X	X	Own st.food/drug list
Anti-substitution	X	X				Repealed 1976
Limit on No. of Rxs	2	2				Ended July 1, 1975
Dollar Limit						
Size Limit	X	X	X	X	X	
Prior Authorizati[illegible]	X	X	X	X	X	Selected drugs
State MAC	X	X	X	X	X	
Co-payment						
Amount						

*1) AWP-100's
2) Direct prices
11 manuf. w/ low min. order qty.
3) 12 drugs at 500 or 1000 prices

STATE SUMMARY

State: COLORADO

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	--	$9.63	--	$11.87	
Rx Per Recipient	--	--	--	--	--	
Avg Rx Price	--	--	--	--	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	1.85					
$2.00-$2.50		2.00	2.00			
$2.51-$3.00				2.50	2.90	Effective 12/1/78
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	Adopted EAC 1978
AWP Less Discount						Only on one drug
Wholesaler Supplied		X	X	X	X	If not Red Book
Dir Price/Select Prod					X	
Quan Price/Select Prod					X	
Federal Decile						
Decile						
Other						
Usual and Customary						
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	
Closed						
Anti-substitution	X	X				Repealed 1976
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	No more than 100 day supply
Prior Authorization	X	X	X	X	X	
State MAC	X	X	X	X	X	1972
Co-payment						
Amount						

STATE SUMMARY

State: CONNECTICUT

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$8.45	$9.07	$9.76	$9.53	
Rx Per Recipient	—	--	--	--	--	
Avg Rx Price	$4.41	--	--	--	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						Lower fee nurs homes
$2.00-$2.50	2.00	2.20	2.20	2.20		
$2.51-$3.00					2.52	
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod			X	X	X	
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X	X		Substitution bill in effect 1 year
Limit on No. of Rxs						
Dollar Limit	10.00	10.00	10.00	16.00	25.00	No limit July 1978
Size Limit	X	X	X	X	X	30 day supply
Prior Authorization	X	X	X	X	X	
State MAC						Always AWP & fee
Co-payment						
Amount						

STATE SUMMARY

State: DELAWARE

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$7.15	$7.86	$7.50	$7.00	
Rx Per Recipient	--	1.4	1.4	1.3	--	
Avg Rx Price	$5.53	$5.23	$5.60	$5.79	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.00	2.00	2.00	2.00		
$2.51-$3.00					2.50	Effective 7/1/78
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP						
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other	AAC	AAC	AAC	AAC	AAC	
Usual and Customary	X	X	X	X	X	If lower than AAC + 2.00
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution						
Limit on No. of Rxs						Utilization Review
Dollar Limit						
Size Limit						
Prior Authorization						Only restriction must be legend drug†
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: DISTRICT OF COLUMBIA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$8.01	$8.47	$7.20	$6.67	
Rx Per Recipient	--	1.7	1.7	1.4	--	
Avg Rx Price	$4.13	$4.64	$5.00	$5.02	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	1.60	1.80	1.80	1.80		
$2.00-$2.50						
$2.51-$3.00					2.59	
> $3.00						
Percentage Markup						OTC's only
Percentage						Cost + 50%
INGREDIENT COST						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	90% local wholesale 10% ave.wholesale price
Dir Price/Select Prod					X	Only on 5 items
Quan Price/Select Prod			X	X	X	
Federal Decile						
Decile						
Other						
Usual and Customary			X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	
Closed						
Anti-substitution						Never had
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	1 month supply (antibiotics-10 day)
Prior Authorization	X	X	X	X	X	
State MAC						
Co-payment				X	X	
Amount				.50	.50	

STATE SUMMARY

State: FLORIDA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$10.68	$9.93	$10.53	$10.00	
Rx Per Recipient	--	2.0	1.9	1.9	--	
Avg Rx Price	$4.73	$ 5.38	$5.36	$ 5.60	--	
DISPENSING FEE						
Flat				X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50				2.40		
$2.51-$3.00					2.75	
> $3.00						
Percentage Markup	X	X	X			
Percentage	Varied	Varied	Varied			Varied from 16%-100% Average 33.3-40%
INGREDIENT COST						Prior to 7/77 Then MAC/EAC implemented
AWP	X	X	X			
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod				X		
Federal Decile						
Decile						
Other	Based on % of bottle used:based on Fla. wholesale price; 47 exceptions					
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	
Closed						
Anti-substitution						
Limit on No. of Rxs						
Dollar Limit	20.00	20.00	20.00	20.00	22.00	Nursing homes $30.00
Size Limit	X	X	X	X		34 day supply
Prior Authorization	X	X	X	X	X	
State MAC				X		Postponed from 8/76
Co-payment				X	X	11/77 through 11/78
Amount				.50	.50	

STATE SUMMARY

State: GEORGIA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$10.10	$10.82	--	$14.21	
Rx Per Recipient	--	2.2	2.3	--	--	
Avg Rx Price	$5.09	$4.67	$4.70	$5.31	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.00	2.00	2.00	2.19	2.35	
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP		X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod		X	X	X	X	
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	30 day supply
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	With exceptions
Closed						
Anti-substitution	X	X	X	X		
Limit on No. of Rxs						
Dollar Limit						Rx over $50 reviewed
Size Limit	X	X	X	X	X	30 day supply
Prior Authorization						
State MAC						
Co-payment		X	X	X	X	
Amount		.50	.50	.50	.50	Effective 8/1/75

STATE SUMMARY

State: IDAHO

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	—	$7.99	$7.61	$7.81	$8.51	
Rx Per Recipient	--	1.5	1.4	1.3	--	
Avg Rx Price	$4.89	$5.20	$5.59	$5.96	--	
DISPENSING FEE						
Flat						
Variable				X	X	Prior to 1977 no billing restrictions
Amount						
< $2.00						
$2.00-$2.50				2.25 -	2.25 -	
$2.51-$3.00				↑ 2.30	↑ 2.30	
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST	Oct.'71 - Aug. '77: Whatever pharmacist billed program paid					
AWP				X	X	
AWP Less Discount						
Wholesaler Supplied				X	X	9 companies
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary				X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	
Closed						
Anti-substitution	X	X	X	X		1970
Limit on No. of Rxs						
Dollar Limit	20.00	20.00	20.00	20.00	35.00	$35 effective 7/1/78
Size Limit	X	X	X	X	X	34 day supply
Prior Authorization						
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: ILLINOIS

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$7.14	$7.27	$7.84	$8.37	
Rx Per Recipient	--	1.5	1.5	1.6	--	
Avg Rx Price	$4.94	$4.68	$4.83	$5.01	--	
DISPENSING FEE						
Flat		X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50		2.05	2.35	2.35		
$2.51-$3.00					2.75	
> $3.00						
Percentage Markup	X					$1.35 plus 30%
Percentage	30%					
INGREDIENT COST						
AWP	X	X	X			
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	To some extent
Dir Price/Select Prod						
Quan Price/Select Prod	X	X	X	X	X	
Federal Decile			X	X	X	
Decile			50%	50%	50%	
Other	X	X	X	X	X	Actual acquisit.cost
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	
Closed						
Anti-substitution						
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	1 month supply
Prior Authorization	X	X	X	X	X	
State MAC	X	X	X	X	X	
Co-payment						
Amount						

STATE SUMMARY

State: INDIANA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$10.68	$14.47	$15.91	$17.37	
Rx Per Recipient	--	2.4	3.3	3.4	--	
Avg Rx Price	$4.25	$4.43	$4.39	$4.76	--	
DISPENSING FEE						
Flat						
Variable						
Amount						
< $2.00	1.85	1.85				
$2.00-$2.50			2.25	2.25	2.25	Interim
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	AWP still in effect
AWP Less Discount						
Wholesaler Supplied	X	X	X			
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile			X	X	X	
Decile			Below 70%		70%	
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	
Closed						
Anti-substitution	X	X	X	X	X	
Limit on No. of Rxs						
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	Schedule II Drugs
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: IOWA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$9.14	$9.87	$9.95	$11.47	
Rx Per Recipient	--	1.8	1.7	1.7	--	
Avg Rx Price	$4.74	$5.14	$5.68	$6.02	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.15	2.15	2.15			
$2.51-$3.00				2.55	2.55	
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	Otherwise use manuf cat.
Dir Price/Select Prod	X	X	X	X	X	
Quan Price/Select Prod	X	X	X	X	X	Tablets 100 & 500 price
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X				Repealed July 1976
Limit on No. of Rxs						
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	Began 1972
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: KANSAS

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$10.99	$11.77	$12.11	$10.33	
Rx Per Recipient	--	2.4	2.3	2.3	--	
Avg Rx Price	$4.30	$ 4.61	$ 5.15	$ 5.33	--	
DISPENSING FEE						
Flat						
Variable	X	X	X	X	X	
Amount						
< $2.00	1.19 to	1.24 to	1.24 to	1.30 to	1.30 to	
$2.00-$2.50	2.25	2.25	2.35			
$2.51-$3.00				2.65		
> $3.00					3.25	
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	EAC since 1973
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	Kansas wholesalers
Dir Price/Select Prod	X	X	X	X	X	7 manufacturers
Quan Price/Select Prod	X	X	X	X	X	100 & pint size
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						Not approved formulary List of NDC & prices
Formulary:						
Open	X	X	X	X	X	
Closed						
Anti-substitution	X	X	X	X	X	Repealed July 1978
Limit on No. of Rxs						
Dollar Limit						
Size Limit						
Prior Authorization		X	X	X	X	October 1975
State MAC						
Co-payment			X	X	X	
Amount			50¢	50¢	50¢	

STATE SUMMARY

State: KENTUCKY

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$6.95	$6.68	$6.13	$9.00	
Rx Per Recipient	--	2.0	1.9	1.7	--	
Avg Rx Price	$3.23	$3.42	$3.55	$3.53	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	1.65	1.80	1.80	1.80		
$2.00-$2.50					2.22	
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod	X	X	X	X	X	
Quan Price/Select Prod	X	X	X	X	X	
Federal Decile						
Decile						
Other	X	X	X	X	X	Prices supplied by pharm.
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed	X	X	X	X	X	
Anti-substitution						Repealed 1972
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	Removed in 1978
Prior Authorization		X	X	X	X	Non-formulary drugs
State MAC	X	X	X	X	X	Implemented 1961
Co-payment						
Amount						

STATE SUMMARY

State: LOUISIANA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient		$14.50	$15.51	$15.56	$15.74	
Rx Per Recipient		2.8	2.7	2.2		
Avg Rx Price	$5.20	$5.21	$5.02	$7.03		
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.10	2.10	2.10	2.35		
$2.51-$3.00					2.80	
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed				X	X	
Anti-substitution	X	X	X	X	X	
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	1 month supply
Prior Authorization						
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: MAINE

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$7.98	$8.23	$9.11	$9.48	
Rx Per Recipient	--	--	--	--	--	
Avg Rx Price	--	--	--	--	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	2.00	2.00	2.00	2.00	2.00	
$2.00-$2.50						
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	Charge more for certain drugs
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary					X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X				Repealed 1976
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	180 day supply
Prior Authorization				X	X	
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: MARYLAND

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$8.14	$9.18	$8.70	$6.85	
Rx Per Recipient	--	--	1.7	1.5	--	
Avg Rx Price	$4.53	--	$5.40	$5.90	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	1.75					
$2.00-$2.50		2.00	2.00	2.25	2.45	
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	Red Book Prices
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod	X	X	X	X	X	
Quan Price/Select Prod	X	X	X	X	X	
Federal Decile			X 70%	X 70%	X 70%	
Decile						
Other	Reserve rt. to limit prices below MAC (1976 - 1978)					
Usual and Customary						
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X			Effective 1977
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	100 day/or Rx + 2 refills
Prior Authorization	X	X	X	X	X	Over $20 for Rx.
State MAC						
Co-payment			X	X	X	
Amount			.50	.50	.50	

STATE SUMMARY

State: MASSACHUSETTS

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$7.66	$4.91	$5.20	$5.83	
Rx Per Recipient	--	--	0.9	--	--	
Avg Rx Price	--	--	$5.66	--	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	1.85					
$2.00-$2.50		2.10	2.10	2.10		
$2.51-$3.00					2.70	Effective 9/14/78
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X		
AWP Less Discount					X	Less 5%
Wholesaler Supplied					X	Generic drug medians
Dir Price/Select Prod					X	40 drugs
Quan Price/Select Prod					X	500-1000 size/less 5%
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X	X	X	Repealed 10/1/78
Limit on No. of Rxs	X	X	X	X	X	5 refills in 6 mos.
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	For spec. requests
State MAC						
Co-payment						No
Amount						

STATE SUMMARY

State: MICHIGAN

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$10.54	$9.90	$9.63	$11.32	
Rx Per Recipient	--	2.1	1.9	1.7	--	
Avg Rx Price	$4.49	$ 5.00	$5.34	$5.75	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.00	2.19	2.19	2.40		
$2.51-$3.00					2.75	
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount	X	X	X	X	X	
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other	X	X	X	X	X	AAC
Usual and Customary						
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X					Repealed 1975
Limit on No. of Rxs	X	X	X	X	X	Rx plus 3 refills in 120 days
Dollar Limit						
Size Limit	X	X	X	X	X	1 month supply
Prior Authorization	X	X	X	X	X	For anorexics
State MAC					X	
Co-payment				X		Rescinded after 6 mos
Amount				$.50		

STATE SUMMARY

State: MINNESOTA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$8.36	$12.30	--	$12.98	
Rx Per Recipient	--	1.6	2.1	--	--	
Avg Rx Price	$4.80	$5.35	$5.82	--	--	
DISPENSING FEE	Lower of state maximum charge or pharmacists submitted charge					
Flat						
Variable	X	X	X	X	X	$1.20 - $5.00
Amount						
< $2.00						
$2.00-$2.50						
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution						
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	30 day acute supply
Prior Authorization						
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: MISSISSIPPI

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$12.18	$13.90	$12.34	$15.02	
Rx Per Recipient	--	2.5	2.6	2.3	--	
Avg Rx Price	$4.34	$4.86	$5.28	$5.42	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	1.50	1.75	1.75			
$2.00-$2.50				2.25	2.25	
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod	X	X	X	X	X	
Quan Price/Select Prod	X	X	X	X	X	
Federal Decile			X	X	X	
Decile			70%	70%	70%	
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed	X	X	X	X	X	
Anti-substitution	X	X	X	X	X	
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	1 month supply
Prior Authorization						
State MAC	X	X	X	X	X	
Co-payment			X	X		
Amount			50¢	50¢		

STATE SUMMARY

State: MISSOURI

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$7.12	$8.03	--	$10.93	
Rx Per Recipient	--	1.7	1.7	--	--	
Avg Rx Price	$3.90	$4.17	$4.61	--	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	1.25	1.50	1.75			
$2.00-$2.50				2.25	2.25	
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod	X	X	X	X	X	
Quan Price/Select Prod	X	X	X	X	X	
Federal Decile			X	X	X	
Decile			70 or below	70 or below	70 or below	
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						Since 1967 closed formulary
Formulary:						
Open						
Closed	X	X	X	X	X	
Anti-substitution	X	X	X	X	X	Repealed 1979
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	Removed in 1979
Prior Authorization						
State MAC	X	X	X	X	X	
Co-payment						
Amount						

STATE SUMMARY

State: MONTANA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$8.76	$8.93	--	$11.48	
Rx Per Recipient	--	2.2	2.3	--	--	
Avg Rx Price	$4.45	$4.02	$4.41	--	--	
DISPENSING FEE						
Flat						
Variable				X	X	
Amount						
< $2.00				2.00	2.00	Up to $3.25
$2.00-$2.50						
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP			X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod			X	X	X	
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X			Repealed 1977
Limit on No. of Rxs						
Dollar Limit						
Size Limit						
Prior Authorization						
State MAC						
Co-payment	X	X	X	X	X	
Amount	$.50	$.50	$.50	$.50	$.50	Over 2 refills

STATE SUMMARY

State: NEBRASKA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$12.25	$13.83	$14.53	$15.65	
Rx Per Recipient	--	2.2	2.3	2.2	--	
Avg Rx Price	$5.27	$5.56	$6.00	$6.48	--	
DISPENSING FEE						
Flat						
Variable	X	X	X	X	X	
Amount						
< $2.00	1.75 to 2.45	1.75 to 2.45	1.75 to 2.45			
$2.00-$2.50				2.20 to 2.79	2.33 to 2.79	
$2.51-$3.00						Higher for 30 day
> $3.00						↑ supply
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod				X	X	
Federal Decile						
Decile						
Other						
Usual and Customary					X	7-1-77
PROGRAM RESTRICTIONS						
Formulary:						
Open				X	X	
Closed						
Anti-substitution	X	X	X	X		Repealed 9/78
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	Month supply-selected drugs
Prior Authorization	X	X	X	X	X	Anorexics, vitamins
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: NEVADA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$10.95	$12.31	$9.72	$10.96	
Rx Per Recipient	--	1.8	1.8	1.5	--	
Avg Rx Price	$5.71	$6.17	$7.00	$6.52	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.40					
$2.51-$3.00		2.75	2.75	2.90	2.90	
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X				
AWP Less Discount			X	X	X	
Wholesaler Supplied	X	X				
Dir Price/Select Prod						
Quan Price/Select Prod	X	X	X	X	X	
Federal Decile						
Decile						
Other						
Usual and Customary			X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X	X	X	
Limit on No. of Rxs			3	3	3	
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	
State MAC						
Co-payment			X	X	X	
Amount			.50	.50	.50	

STATE SUMMARY

State: NEW HAMPSHIRE

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$10.47	$9.77	$10.12	$10.82	
Rx Per Recipient	—	2.2	1.9	1.9	—	
Avg Rx Price	$4.85	$4.78	$5.12	$5.42	—	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.20	2.20	2.20	2.20		
$2.51-$3.00					2.70	
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X			
AWP Less Discount						
Wholesaler Supplied			X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary			X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X	X	X	
Limit on No. of Rxs						
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	For non-covered items
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: NEW JERSEY

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$7.52	$7.30	$8.38	$9.79	
Rx Per Recipient	--	1.6	1.5	1.6	--	
Avg Rx Price	$4.34	$4.74	$4.94	$5.24	--	
DISPENSING FEE						
Flat						
Variable	X	X	X	X	X	
Amount						
< $2.00		1.80	1.80			Up to 1.90
$2.00-$2.50	2.05			2.05	2.20	Up to 2.15-now 2.50
$2.51-$3.00						
> $3.00						
Percentage Markup Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount	X	X	X	X	X	
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other	If other ingred. cost not applicable, manuf. wholesale suggested used					
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed		X	X	X	X	
Anti-substitution	X	X	X			Implementation in April 1979
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	60 day supply
Prior Authorization	X	X	X	X	X	Specified drugs
State MAC						
Co-payment		X	X			
Amount		25¢	25¢			Aug. 1975-March 1976

STATE SUMMARY

State: NEW MEXICO

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$8.90	$9.40	$10.55	$7.49	
Rx Per Recipient	--	1.6	1.5	1.6	--	
Avg Rx Price	$5.35	$4.68	$6.20	$6.81	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.00	2.00	2.50	2.50		
$2.51-$3.00					2.65	
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X			
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod			X	X	X	
Quan Price/Select Prod			X	X	X	
Federal Decile						
Decile						
Other						
Usual and Customary			X	X	X	As of Aug.26, 1976
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	
Closed						
Anti-substitution	X	X	X	X	X	
Limit on No. of Rxs						
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	Selected drugs
State MAC						
Co-payment				X	X	
Amount				.25	.25	

STATE SUMMARY

State: NEW YORK

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$6.25	$6.66	--	$8.00	
Rx Per Recipient	--	--	--	--	--	
Avg Rx Price	--	--	--	--	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	1.80	1.80	1.80	1.80		NYC:$2.00 1/1/75
$2.00-$2.50					2.10	NYC: 2.30 4/1/78
$2.51-$3.00					2.60	Statewide 7/1/78
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X			
AWP Less Discount						
Wholesaler Supplied			X	X	X	
Dir Price/Select Prod			X	X	X	Top 100-200 drugs
Quan Price/Select Prod			X	X	X	
Federal Decile			X	X	X	
Decile			Below 70%	70%	70%	
Other						
Usual and Customary						
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X	X	X	
Limit on No. of Rxs						Automatic review of Rx's over $50.00
Dollar Limit						
Size Limit						
Prior Authorization						
State MAC						
Co-payment				X		Lasted 1 month
Amount				$.50		

STATE SUMMARY

State: NORTH CAROLINA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	-	$15.14	$7.99	$13.86	$14.06	
Rx Per Recipient	-	-	1.3	2.1		
Avg Rx Price			5.98	6.73		
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.00	2.00	2.50	2.50	2.50	
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount	X	X	X	X	X	for selected drugs
Wholesaler Supplied						
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile				X	X	
Decile				.75	.75	
Other	X	X	X	X	X	
Usual and Customary						
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X			July 1977
Limit on No. of Rxs						
Dollar Limit						
Size Limit						
Prior Authorization						
State MAC						
Co-payment	X	X	X	X	X	
Amount	.50	.50	.50	.50	.50	

STATE SUMMARY

State: NORTH DAKOTA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$16.43	$15.79	$15.05	$15.70	
Rx Per Recipient	--	2.7	2.6	2.1	--	
Avg Rx Price	$5.90	$6.13	$6.07	$7.08	--	
DISPENSING FEE	No dispensing fee (1974 - 1976)					
Flat				X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50				2.50		7/1/77
$2.51-$3.00					2.75	5/1/78
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP			X			
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary				X	X	7/1/77
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	
Closed						
Anti-substitution	X	X	X	X	X	
Limit on No. of Rxs						
Dollar Limit						
Size Limit						
Prior Authorization						
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: OKLAHOMA*

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	--	$4.76	$6.70	$8.23	
Rx Per Recipient	--	--	--	--	--	
Avg Rx Price	--	--	--	--	--	
DISPENSING FEE						
Flat		X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50		2.50	2.50	2.50	2.50	As maximum
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP		X	X	X	X	
AWP Less Discount		X	X	X	X	
Wholesaler Supplied		X	X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						Mostly
Other						
Usual and Customary		X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						An approved list
Open						
Closed						
Anti-substitution		X	X	X	X	Not repealed
Limit on No. of Rxs		X	X	X	X	3 Rx's or 34 day 100 units
Dollar Limit						
Size Limit						
Prior Authorization						
State MAC						
Co-payment						
Amount						

*No drug program until 7/1/75

STATE SUMMARY

State: OREGON

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$6.08	$6.62	$7.24	$8.47	
Rx Per Recipient	--	1.8	2.5	2.6	--	
Avg Rx Price	$3.50	$3.39	$2.62	$2.81	--	
DISPENSING FEE						
Flat			X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50			2.35			
$2.51-$3.00				2.55	2.70	
> $3.00						
Percentage Markup	X	X				
Percentage	50%	50%				+ $.85
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod	X	X	X	X	X	
Quan Price/Select Prod	X	X	X	X	X	
Federal Decile			X	X	X	
Decile			70%	70%	70%	
Other						
Usual and Customary						
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed	X	X	X	X	X	
Anti-substitution	X	X	X	X		7/1/77
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	One month supply
Prior Authorization	X	X	X	X	X	
State MAC	X	X	X	X	X	
Co-payment						No
Amount						

STATE SUMMARY

State: PENNSYLVANIA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$5.80	$14.19	$15.74	$16.21	
Rx Per Recipient	--	1.2	2.8	3.0	--	
Avg Rx Price	$4.76	$5.00	$5.00	$5.47	--	
DISPENSING FEE						
Flat		X	X	X	X	
Variable						
Amount						
< $2.00		1.85	2.00	2.00	2.00	1.35 in N.H.
$2.00-$2.50						
$2.51-$3.00						
> $3.00						
Percentage Markup	X					
Percentage	50%					
INGREDIENT COST						
AWP		X	X	X	X	
AWP Less Discount						Wholesale average
Wholesaler Supplied	X					
Dir Price/Select Prod	X	X	X	X	X	
Quan Price/Select Prod						
Federal Decile						
Decile						Discounts based on sales
Other		X	X	X	X	
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	X
Closed						Effective 1977
Anti-substitution	X	X	X			
Limit on No. of Rxs						
Dollar Limit						
Size Limit						$15 or 45 day supply if exceeds maximums
Prior Authorization	X	X	X	X	X	
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: RHODE ISLAND

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$9.37	$9.67	--	$10.90	
Rx Per Recipient	--	--	--	--	--	
Avg Rx Price	--	--	--	--	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50	2.00	2.00	2.00	2.20	2.20	
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod	X	X	X	X	X	10 manufacturers
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	Calcul. prices used
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X			Repealed 7/76
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	30 day supply/or 100 tab.
Prior Authorization	X	X	X	X	X	
State MAC						No
Co-payment						
Amount						

STATE SUMMARY

State: SOUTH CAROLINA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$7.82	$8.62	$8.73	$8.54	
Rx Per Recipient	--	1.7	1.7	1.6	--	
Avg Rx Price	$4.42	$4.76	$5.11	$5.31	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	1.90	1.90	1.90			
$2.00-$2.50				2.40	2.40	Includes .50 co-pay
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount			X	X	X	7 1/2% discount
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile			X 70%	X 70%	X 70%	
Other						
Usual and Customary						
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed	X	X	X	X	X	
Anti-substitution	X	X	X	X	X	
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	One month supply
Prior Authorization	X	X	X	X	X	Estab. 1968
State MAC						
Co-payment				X	X	
Amount				.50	.50	

STATE SUMMARY

State: SOUTH DAKOTA*

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$7.98	$7.19	$7.31	$8.39	
Rx Per Recipient	--	1.4	1.2	1.1	--	
Avg Rx Price	--	$5.67	$6.27	$6.47	--	
DISPENSING FEE						
Flat		X	X	X	X	
Variable						
Amount						
< $2.00						
$2.00-$2.50		2.25	2.25	2.25	2.50	
$2.51-$3.00						
> $3.00						
Percentage Markup	X					
Percentage	40%					
INGREDIENT COST						
AWP		X	X	X	X	
AWP Less Discount						
Wholesaler Supplied		X	X	X	X	
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary		X	X	X	X	Used as aver. base
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X	X	X	Modified,not repealed
Limit on No. of Rxs						
Dollar Limit						
Size Limit		X	X	X	X	1 month
Prior Authorization						
State MAC						
Co-payment			X	X	X	
Amount			50¢	50¢	50¢	

*Program began July 1974

STATE SUMMARY

State: TENNESSEE

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$11.45	$12.59	$13.33	$15.81	
Rx Per Recipient	--	2.6	2.7	2.7	--	
Avg Rx Price	$4.20	$4.48	$4.76	$5.03	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	1.90					
$2.00-$2.50		2.10	2.10	2.10	2.30	Effective 1/1/78
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP						
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other	AAC	AAC	AAC	AAC	AAC	Determined by post audit
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	
Closed						
Anti-substitution	X	X	X			Repealed 1977
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	Since 1971
Prior Authorization			X	X	X	Abuse drugs
State MAC	X	X	X	X	X	Since 1972
Co-payment						
Amount						

STATE SUMMARY

State: TEXAS

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	-	$9.80	$10.80	$12.52	$13.25	
Rx Per Recipient	-	1.6	1.6	1.7	-	
Avg Rx Price	$5.78	$6.20	$6.84	$7.60	-	
DISPENSING FEE						
Flat						
Variable	X	X	X	X	X	
Amount						
< $2.00	1.68-	1.94-	1.94-			
$2.00-$2.50	2.10	2.36	2.36	2.25-	2.25-	
$2.51-$3.00				2.75	2.75	
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod			X	X	X	
Quan Price/Select Prod						
Federal Decile						
Decile						
Other	X	X	X	X	X	AAC - audits
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X	X	X	
Limit on No. of Rxs	3	3	3	3	3	
Dollar Limit						
Size Limit	X	X	X	X	X	6 month supply
Prior Authorization						
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: UTAH

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$9.58	$8.10	$10.84	$11.83	
Rx Per Recipient	--	--	1.6	2.0	--	
Avg Rx Price	$3.45	--	$5.05	$5.32	--	
DISPENSING FEE						
Flat						
Variable	X	X	X	X	X	
Amount						
< $2.00	1.90					
$2.00-$2.50		2.20	2.20	2.40	2.40	2.40 effective 11/1/77
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod				X	X	Not quite direct
Quan Price/Select Prod				X	X	50 brand name MAC/ EAC
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X			Repealed in 1977
Limit on No. of Rxs						
Dollar Limit						
Size Limit						M.D. judgment
Prior Authorization	X	X	X	X	X	Dexadrine,hyper-kenesis,food suppl.
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: VERMONT

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	—	$10.04	$9.26	$10.31	$10.76	
Rx Per Recipient	--	2.1	1.8	1.8	--	
Avg Rx Price	$6.65	$4.84	$5.14	$5.60	--	
DISPENSING FEE						
Flat	X	X	X	X	X	
Variable						
Amount						
< $2.00	1.85	1.85	1.85	1.85		
$2.00-$2.50					2.00	Or 10% of cost if ↑ exceeds $20.00
$2.51-$3.00						
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod				X	X	
Quan Price/Select Prod	X	X	X			
Federal Decile						
Decile						
Other						
Usual and Customary				X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open					X	
Closed						
Anti-substitution	X	X	X	X	X	Repealed 1978
Limit on No. of Rxs						
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	Non-covered drugs
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: VIRGINIA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$7.78	$7.91	$9.45	$10.82	
Rx Per Recipient	--	1.7	1.6	1.7	--	
Avg Rx Price	$4.16	$4.53	$4.91	$5.41	--	
DISPENSING FEE						
Flat						
Variable						
Amount						
< $2.00	1.95	1.95	1.95			
$2.00-$2.50				2.25		
$2.51-$3.00					2.70	
> $3.00						
Percentage Markup Percentage						
INGREDIENT COST						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod	X	X	X	X	X	If not found in state
Quan Price/Select Prod	X	X	X	X	X	
Federal Decile						
Decile						
Other						
Usual and Customary			X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X	X	X	Not repealed
Limit on No. of Rxs						
Dollar Limit						
Size Limit						Not strict recommend-30 day/100 unit
Prior Authorization						
State MAC						
Co-payment		X	X	X	X	Some cases
Amount		50¢	50¢	50¢	50¢	

STATE SUMMARY

State: WASHINGTON

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$7.93	$9.17	--	$9.54	
Rx Per Recipient	--	1.6	--	--	--	
Avg Rx Price	$4.68	$4.94	--	--	--	
DISPENSING FEE						
Flat	X	X	X	X		
Variable					X	
Amount						
< $2.00	1.95					
$2.00-$2.50		2.15	2.23	2.35	*	Nursing homes lower
$2.51-$3.00					2.60*	
> $3.00						
Percentage Markup	X					
Percentage	40%					until 8-1-79
INGREDIENT COST						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	Special discount
Dir Price/Select Prod	X	X	X	X		7-1-77
Quan Price/Select Prod						
Federal Decile						
Decile						
Other	AAC	AAC	AAC	AAC	AAC	
Usual and Customary						
PROGRAM RESTRICTIONS						
Formulary:						
Open	X	X	X	X	X	
Closed						
Anti-substitution	X	X	X	X		September 1977
Limit on No. of Rxs						
Dollar Limit	15.00	15.00	25.00	25.00	25.00	More requires approv
Size Limit	X	X	X	X	X	
Prior Authorization	X	X	X	X	X	
State MAC	X	X	X	X	X	1972
Co-payment						
Amount						

*2.60 - 35,000 Rx's or less
2.48 - over 35,000 Rx's
2.14 - nursing homes

STATE SUMMARY

State: WEST VIRGINIA

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$6.89	$9.00	$10.17	$10.46	
Rx Per Recipient	--	1.3	1.6	1.7	--	
Avg Rx Price	$4.79	$5.40	$5.60	$6.17	--	
DISPENSING FEE						
Flat					X	
Variable						
Amount						
< $2.00						
$2.00-$2.50					2.25	
$2.51-$3.00						
> $3.00						
Percentage Markup	X	X	X	X		
Percentage	66%:1.50-2.99/ 50%:3.00-7.99/ Over 8.00: 33%					Until 1978
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Dir Price/Select Prod						
Quan Price/Select Prod						
Federal Decile						
Decile						
Other						
Usual and Customary						
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed						
Anti-substitution	X	X	X	X		Repealed 7/78
Limit on No. of Rxs						
Dollar Limit						
Size Limit			X	X	X	1 mo. 5 refills
Prior Authorization	X	X	X	X	X	All injectables
State MAC						
Co-payment						
Amount						

STATE SUMMARY

State: WISCONSIN

	1974	1975	1976	1977	1978	Comments
UTILIZATION DATA						
$ Per Recipient	--	$8.50	$9.67	--	$13.04	
Rx Per Recipient	--	1.7	1.5	--	--	
Avg Rx Price	$4.86	$4.93	$4.98	--	--	
DISPENSING FEE *						
Flat				X	X	
Variable		X	X			
Amount						
< $2.00						
$2.00-$2.50		2.05	2.05	2.40		1974-75 max 2.25
$2.51-$3.00					2.65	
> $3.00						
Percentage Markup						
Percentage						
INGREDIENT COST						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Dir Price/Select Prod	X	X	X	X	X	9 companies
Quan Price/Select Prod	X	X	X	X	X	30 drugs involved
Federal Decile						
Decile						
Other						
Usual and Customary	X	X	X	X	X	
PROGRAM RESTRICTIONS						
Formulary:						
Open						
Closed	X	X	X	X	X	
Anti-substitution	X	X	X			
Limit on No. of Rxs						
Dollar Limit						
Size Limit	X	X	X	X	X	30 day supply
Prior Authorization	X	X	X	X	X	Certain drugs
State MAC	X	X	X	X	X	
Co-payment						
Amount						

*1974 - Usual and customary charges under state guidelines -

Health Care Financing Grants and Contracts Reports

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